Shenzhen C D RF565A Bluetooth Low Energy Remote Control Unit User Manual

Contents

1 Shenzhen C D RF565A Bluetooth Low Energy Remote Control Unit
2 Specifications
3 Product Usage Instructions
4 Introduction
5 Electrical Performance
6 EMC/EMI/ESD/Safety Certifications
7 Appearance check
7.1 Checking Condition
8 Bluetooth RC(HID) Key code Table
9 Printing and Button Color
10 RC Operation
11 FCC
12 FAQ's
13 Documents / Resources
13.1 References

Shenzhen

Shenzhen C D RF565A Bluetooth Low Energy Remote Control Unit

Specifications

- Power Supply: 2 x AAA Alkaline Batteries
- Operating Conditions:
  - Operating Supply Voltage Range: 3.0V, 0.1A
  - Operating Temperature Range: -5°C to +40°C
  - Humidity Range: 45% to 85%
- Bluetooth Profile: HID over GATT Profile (HOGP)
- RF Frequency Band: 2.4GHz ISM Band (2400MHz ~ 2483.5MHz, 40 channels @ 2MHz step)
- Bluetooth Specification: Comply with Bluetooth V4.2 Low Energy (BLE) Specifications
- Pairing: The BLE RC needs to be paired with the Host Device (Amazon Fire TV) before it can be used. The details of pairing procedures can be found in Section 2.11.
- Operation Modes:
  - Normal Operation Mode: The RC is connected to The ost Device and sends HID Key codes when a key or Voice Control operation is triggered.
  - Sleep Mode: As soon as any of RC keys are pressed, the RC shall be wakened up anthe d re-connected

with the Host device within 500ms.

- Unit Weight and Dimension: 38.16 x 158.03 x 17 mm
- Hardware and Software Version:
  - HW: PCB: RF565A-V1.0
  - Out-of-box FW Ver. and Setting:
    - FW Ver.: Sunflower_FW18
    - SKUID: 0x006A
    - IRID: 0x0001
    - PID: 0x0424
    - Device code: 2BN
- HW Specification:
  - Battery Type: 2 AAA alkaline (replaceable)
  - Battery lifetime: More than 12 months
  - Dimensions: 38.16 x 158.03 x 17 mm
  - Weight: N/A
  - SoC chip: N/A
  - Bluetooth: N/A
  - Voice: N/A
  - Fire TV buttons: Netflix button, Prime Video, Disney+, Hulu(US)/Amazon Music(CA)
  - Host List: N/A
  - Certification: CE, BT Sig
  - LED: 2 IR LED + 1 RGB LED
  - PCB: 2-layer/FR4
  - SW: Sunflower_FW18
  - Plastic Material:
    - No PCR resin requirement
    - Material spec benchmark: ABS 758 Equivalent

Product Usage Instructions

Pairing the Remote Control
The BLE RC needs to be paired with the Host Device (Amazon Fire TV) before it can be used. Please refer to Section 2.11 of the user manual for detailed pairing procedures.

Operating Modes
The RC has two operating modes:

- Normal Operation Mode: In this mode, the RC is connected to the Host Device and sends HID Key codes when a key or Voice Control operation is triggered.
- Sleep Mode: In this mode, the RC is on standby and conserving power. When any of the RC keys is pressed, the RC will wake up and re-connect with the Host Device within 500ms.

Power Supply
The Remote Control requires 2 AAA Alkaline Batteries as the power supply.

Operating Conditions
The Remote Control has the following operating conditions:

- Operating Supply Voltage Range: 3.0V
- Operating Current: 0.1A
- Operating Temperature Range: -5°C to +40°C
- Humidity Range: 45% to 85%

Bluetooth Profile and Specification
The Remote Control uses the HID over GATT Profile (HOGP) and complies with Bluetooth V4.2 Low Energy (BLE) Specifications.

Dimensions and Weight
The Remote Control has the following dimensions: 38.16 x 158.03 x 17 mm. The weight is not specified.

Introduction

Scope
This document is to specify the technical specifications of the Bluetooth Low Energy Remote Control Unit based on the RTL8762D platform, which complies with Bluetooth V5.0 Low Energy Specifications. The unit is powered by 2x AAA Alkaline batteries with power consumption as low as 10uA in Sleep mode when it is not in use. RC can be woken up from Sleep mode and re-connected with the Host device(Amazon Fire TV, OS 7.0) within 500ms when any of the RC keys is pressed.

The following basic functions are supported in this Remote Control (RC) Unit:

- RC Keys(BLE+IR)
- Voice Control over BLE
- LED behavior
- Device Control System(DCS)
- Firmware OTA (Firmware upgraded Over the Air)

Power Supply:
2 x AAA Alkaline Batteries

Operating Conditions:

- Operating Supply Voltage Range: 3.0V, 0.1A
- Operating Temperature Range: -5℃ ~ +40℃
- Humidity 45% ~ 85%

Bluetooth Profile:
HID over GATT Profile (HOGP)

RF Frequency Band:
2.4GHz ISM Band (2400MHz ~ 2483.5MHz, 40 channels@ 2MHz step).

Bluetooth Specification:
Comply with Bluetooth V4.2 Low Energy(BLE) Specifications.

Pairing:
The BLE RC needs to be paired with the Host Device (Amazon Fire TV) before it can be used. The details of pairing procedures can be found in Section 2.11.

Operation modes:
RC can enter into either Normal Operation Mode or Sleep Mode.

- Under Normal Operation Mode, the RC is connected to the Host Device and sends HID Key codes when a key or Voice Control operation is triggered.
- Under Sleep mode, as soon as the any of RC keys is pressed, the RC shall be wakened up and re-connected with the Host device within 500ms.

Unit Weight and Dimension

- 49g±2g (Net Weight, excluding batteries)
- 38.16 x 158.03 x 17 mm

Hardware and Software Version:

- HW: PCB: RF565A-V1.0
- Out-of-box FW Ver. and Setting:

FW Ver.	SKUID	IRID	PID	Device code
Sunflower_FW18	0x006A	0x0001	0x0424	2BN

HW Specification

Feature	POR
Battery Type	2 AAA alkaline (replaceable)
Battery lifetime	More than 12 months
Dimensions	38.16 x 158.03 x 17 mm
Weight	49g±2 g (without batteries)
SoC chip	Realtek RTL8762DFA
Bluetooth	Bluetooth V5 Low Energy (BLE)
Voice	Single Mic (MSM38A3729Z8 or equivalent) + Near Field (push to talk)
Fire TV buttons	Power, Voice, Volume +, Volume -, Mute, D-Pad, Home, Back, Menu, PP/FF/RW, G uide, Prime Video, Mute, Channel Up, Channel Down
Host List	please refer to the host list
Content Partner Buttons	Netflix button, Prime Video, Disney+, Hulu(US)/Amazon Music(CA)
Certification	CE, BT Sig
LED	2 IR LED + 1 RGB LED
PCB	2-layer/FR4
SW	Sunflower_FW18
Plastic Material	– No PCR resin requirement, – material spec benchmark: ABS 758 Equivalent
	1. Requirments – UL94 Flame Class Compliance: HB (1.2mm ~ 6mm), HWI (1.5mm – 4, 3mm – 3, 6mm – 3),
	HAI 0 (1.5mm ~ 6mm), RTI Elec, Imp, Str (60) – ROHS Compliance 2. Texture FH : MT11500, SPI-A2, Amazon Badge MF : MT11500 main surfaces, S PI-A2, Lens area, battery surround BC : MT11500, SPI-A2, Eject Icon
Packaging	PE Bag / Carton box

REFERENCES

1. BS EN 60950-1:2006+A2:2013: Information technology equipment. Safety General requirements specify requirements intended to reduce risks of fire, electric shock or injury for the OPERATOR and layman who may come into contact with the equipment and, where specifically stated, for a SERVICE PERSON.
2. ETSI EN 300 328 V1.8.1 (2012-06): Electromagnetic compatibility and Radio spectrum Matters (ERM); Wideband transmission systems; Data transmission equipment operating in the 2,4 GHz ISM band and using wide band modulation techniques; Harmonized EN covering the essential requirements of article 3.2 of the R&TTE Directive [Harmonized European Standard (Telecommunications series)]
3. FCC PART 15C- Intentional Radiators: American EMC Standard
4. IC RSS 247: Radio Standards Specification RSS-247, Issue 2, Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices
5. ETSI EN 300 328 V1.9.1 (2015-02): Electromagnetic compatibility and Radio spectrum Matters (ERM); Wideband transmission systems; Data transmission equipment operating in the 2,4 GHz ISM band and using wide band modulation techniques; Harmonized EN covering the essential requirements of article 3.2 of the R&TTE Directive.
6. ETSI EN 301 489-1 V1.9.2 (2011-09): Electromagnetic compatibility and Radio spectrum Matters (ERM); Electro Magnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements.
7. ETSI EN 301 489-17 V2.2.1 (2012-09): Electromagnetic compatibility and Radio spectrum Matters (ERM); Electro Magnetic Compatibility (EMC) standard for radio equipment; Part 17: Specific conditions for Broadband Data Transmission Systems
8. Bluetooth Core Specification V4.0(30 June 2010)

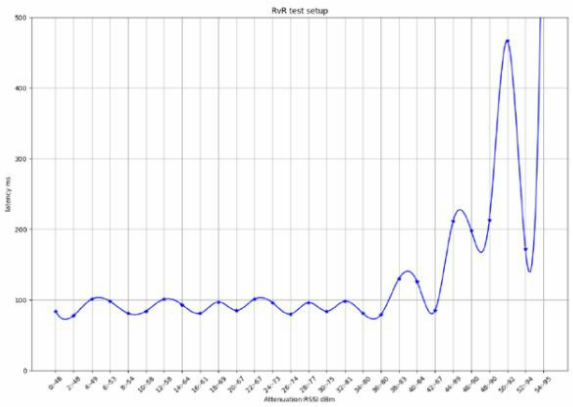
Electrical Performance

SN	Test Item	Requirement	Test Condition
2.1	Control Distance(RF)	≥10m for Key operation ≥10m for Voice Control	Test in the shielded room. Use BT Dongle as HOS T device, pairing with Remote Control (EUT). Teste d with new 2x AAA batteries, or 3V DC supply. Pre ss the key and observe the responses on the PC s creen and the LED blinking on the BT dongle.
2.2	Operation Power Supply Range	DC 2.1V ~ 3.3V	All the main functions (Key, Voice) of RC should be operating correctly within the defined supply Voltag e Range (DC power Supply Source).
2.3	Current Consumpt ion in Power models	w 50uA (typical) @ Conne cted Idle (TV Session) w 2.5mA (Max) @ Short B utton Press (BLE) w 22mA (Max) @ Voice Operation	RC is powered by a 3V external DC power supply (connected through a 10Ω resistor to simulate the i nternal impedance of the battery), Measure the av erage power supply current with a multi-meter in e ach of the power models.

<table>
<tr><td>2.4</td><td>Current Consumption in Sleep Standby
with host off</td><td>≤20uA</td><td>RC is powered by an external 3V DC power supply (connected through a 10Ω resistor to simulate the internal impedance of the battery), Measure the average power supply current with a
multi-meter in Sleep Standby(with host off)</td></tr>
<tr><td>2.5</td><td>IR Operating Distance: Transmission Level</td><td>Follow Amazon’s Spec.:
1. ≥15μW/cm2 or >10m
2. ≥15μW/cm2 or >10m
3. ≥15μW/cm2 or >10m</td><td>Fire TV
1. 0
2. 30
3. 30
Test over standard approved Fire TV:
1. Remote control maximum operating range at zero angle
2. Horizontal IR beam angle >30 Degrees (+/- 15 degrees from center)
3. Vertical beam angle > 30
Degrees (0 degrees to 30 degrees)</td></tr>
<tr><td>2.6</td><td>Contact
Resistance</td><td>≤2KΩ (between Input and
Output ports of MCU.)</td><td>Press and hold any of the keys, and measure the resistance
between the Input and Output ports of the MCU.</td></tr>
<tr><td>2.7</td><td>Battery Lifetime</td><td>More than 12months</td><td>According to Amazon’s defined battery modeling
<table>
<tr><th>Usage Cases</th><th>Nbr of Events a Day()</th></tr>
<tr><td>Short Button Press Home Key (BLE)</td><td>10</td></tr>
<tr><td>Short Button Press Navigation Key (BLE)</td><td>600</td></tr>
<tr><td>IR Button Press (Power Off)</td><td>30</td></tr>
<tr><td>Single IR1 SIDE Blast System Level (Used for Input Switching projections)
1:Volume Control (IR) + Mute + Misc. DC
2:Channel Rocker and Numpad (New for Wilbur) - IR only mode for STB control</td><td>400</td></tr>
<tr><td>Home from any source Power after event (Used for Input Switching projections)</td><td>20</td></tr>
<tr><td>Power, Input Switching and Alexa
interactions via IR</td><td>40</td></tr>
<tr><td>Voice Search(include Blue LED light)</td><td>30</td></tr>
<tr><td>Connected Idle</td><td>1</td></tr>
<tr><td>Sleep Standy with host off</td><td>1</td></tr>
<tr><td>Voice Serch LED
LED blinks in Blue for 5 seconds after the user releases the voice button</td><td>300</td></tr>
<tr><td>Extra Blue Blinks per day, 100% Duty (PM Asks)</td><td>100</td></tr>
<tr><td>Extra Blue Blinks per day, 50% Duty (PM Asks)</td><td>0</td></tr>
<tr><td>Wakeup Events Power ON</td><td>10</td></tr>
</table></td></tr>
</table>

<table>
<tr><td>2.8</td><td>TX Power</td><td>-12dBm ≤TX Power ≤0dBm</td><td rowspan="2">u Test Method: Radiated method.
u Test equipment: Lite Point 8852B.
u Test channels:2402MHz, 2442MHz, 2480MHz.
u Test point: Feed point of Antenna and its matching network (Note: in mass production, the antenna and its matching network need to be kept</td></tr>
<tr><td>2.9</td><td>Initial Frequency
error tolerance (f0)</td><td>-75KHz≤ f0≤75KHz</td></tr>
</table>

2.10	RX Sensitivity	≤-70dBm @BER=0.1%	connected for continuous production). u ta packets, Lite Point receives the packets and measures the RF p erformance. u packets at a TX power of -70dBm, EUT (RC) recei ves the data packets and measures the BER via s erial interface test points, BER shall not be more th an 0.1%.
2.11	Pairing Success R ate:	≥99%	To be tested in the RF shielding room. RC is paired with the Host Device at a distance of 1 meter. 1) Virgin Pairing: u Pre-condition: RC is Virgin and the Pairing tabl e is empty; u On a Virgin RC, press the “Home” key for 9s, th e RC will enter into Advertising mode and execute pairing. A successful Pairing can also be verified b y RC controlling the Host Device. u In case the pairing is unsuccessful, the RC will discard all the data during pairing, exit from Adverti sing mode, clear the pairing table and go back to t he Virgin mode. Repeat the above procedures if another pairing is needed. 2) Re-Pairing: u Pre-condition: RC is paired with a Host Device before. u Press the “LEFT+BACK+OPTION” combi-key f or 12s, the RC will clear the old pairing table, and t hen enter into Advertising mode and execute pairi ng. A successful Pairing can also be verified by R C controlling the Host Device. u In case the pairing is unsuccessful, the RC will discard all the data during pairing, exit from Adverti sing mode, clear the pairing table and go back to it s original status. Repeat the above procedures if another pairing is needed.

2.12	Timing of entering into Sleep mode	6-8 Minutes	For the STR mode, the required time is around 6-8 Minutes to get into STR mode and 8-10 seconds t o wake up from STR mode.
2.13	Re-connection Ti me	≤ 4-5s	When RC is in Sleep Standby (with host off), trigg ering any key, RC shall be re-connected with the H ost Device within 4-5 s.
2.14	Voice Sensitivity@1KHz	≥ -30dB	Tested in Anechoic Box, with BLE USB dongle and Electro-Acoustic Testing System Software.
2.15	Voice S/N@1KHz	≥ -30dB	
2.16	HD@1kHz	≤ 5%	
2.17	Connectivity KPI(RSSI)	Button press latency<KPI limit (300ms) with RSSI st ronger than -90dBm.	Testing at the Neusoft connectivity testing lab is re quired This chart is for the reference test 

EMC/EMI/ESD/Safety Certifications

SN	Certification/Test Item	Regulation Authorities	Regulation Standards
5.1	END	IEC / ETSI	IEC 61000-4-2: 2008 / EN 61000-4-2: 2009 - Electromagnetic compatibility (EMC) – Part 4-2: Testing and measurement techniques – Electrostatic disc harge immunity test • Air discharge: ± 4kV ± 8kV ± 15kV, • Discharge Module: 150pF/330Ω. • No functional failures and no parts should be damaged after tests.
5.2	CE	ETSI	**SAFETY:** –EN 62368-1:2018 Audio/video, information and communicati on technology equipment – Part 1: Safety requirements (or la test amendment) –EN 62479 Assessment of the compliance of low power elect ronic and electrical equipment with the basic restrictions relat ed to human exposure to electromagnetic fields (10 MHz to 3 00 GHz) (or latest amendment) **ERM/EMC:** ETSI EN 301 489-1 V2.1.1 (2017-02) Electro Magnetic Compatibility (EMC) standard for radio equipment and service s;

			Part 1: Common technical requirements; Harmonised Standard covering the essential requirements of article 3.1(b) of Directive 2014/53/EU and the essential requirements of article 6 of Directive 2014/30/EU (or latest amendment) ETSI EN 301 489-17 V3.1.1 (2017-02) Electro Magnetic Compatibility (EMC) standard for radio equipment and services; Part 17: Specific Conditions for Broadband Data Transmission Systems; Harmonised Standards covering the essential requirements of article 3.1(b) of Directive 2014/53/EU (or latest amendment) ETSI EN 300 328 V2.1.1 (2016-11) Wideband transmission systems; Data transmission equipment operating in the 2,4 GHz ISM band and using wide band modulation techniques; Harmonised Standard covering the essential requirements of article 3.2 of Directive 2014/53/EU (or latest amendment)
5.3	BBQ	Bluetooth SIG	Bluetooth V5.0 Low Energy Specifications

Note:

- The specific regulatory certifications depend on the individual region where the product will be marketed.
- The regulation standards could be changed at any time by different regulative authorities, so please check the details of the newest official regulation standards at the beginning of each certification process.
- The Remote Control Unit must be labeled with the Approved ID numbers according to the specific requirements of individual regulation authorities.
- Declaration Statement of Conformity must be included in the user manual of the Host end product according to the specific requirement of individual regulation authorities.

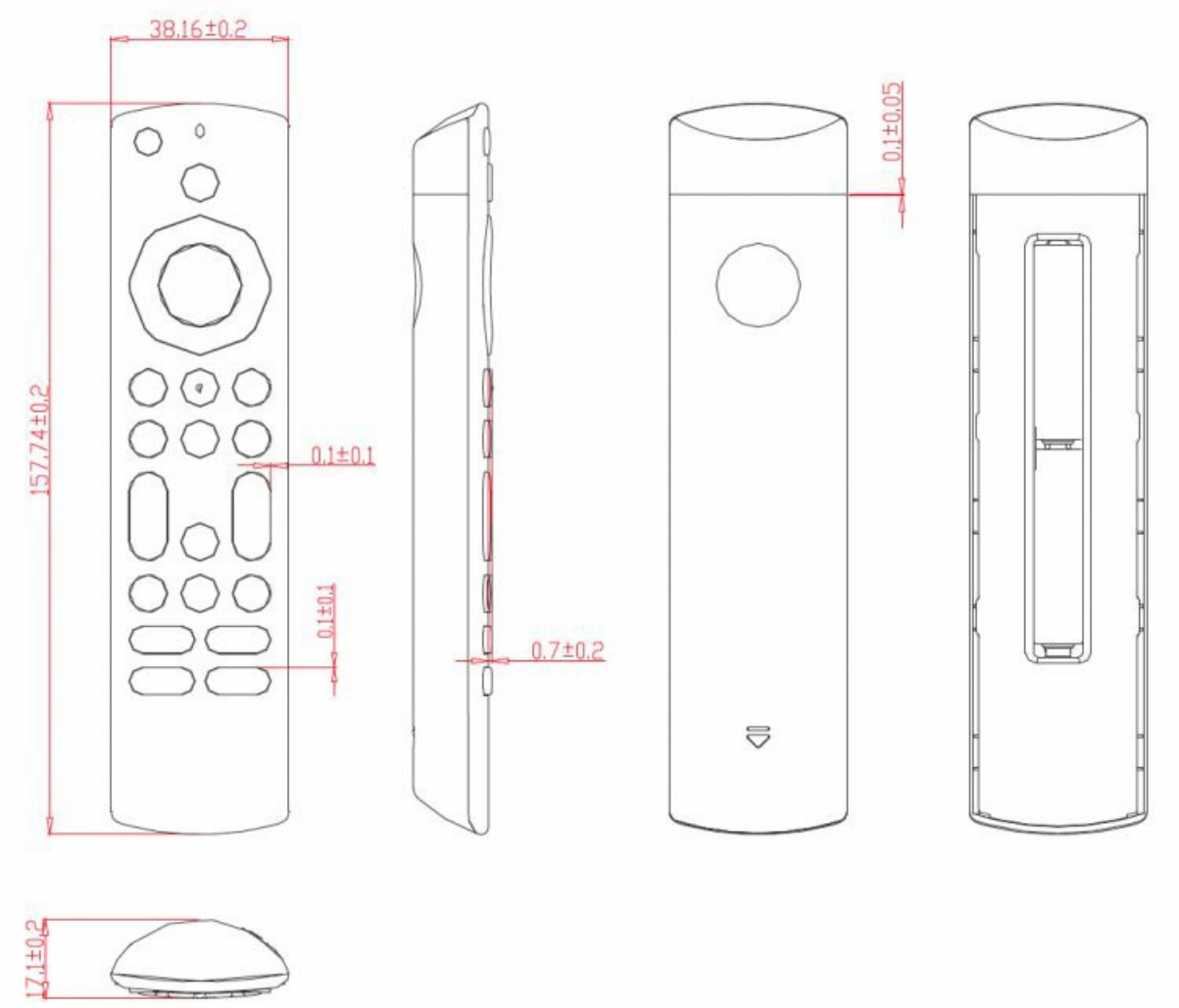
Appearance check

Checking Condition

Part checking position

- Checking angle Customer viewing position = front side Light intensity: 600 – 1000 lux
- Checking distance: 50cm within 10 seconds

Requirement



100% Visual inspection checking, Smooth at Foil edges
Finishing Defects in mm(=or less than)
The key symbol cannot offset more than 1°C horizontally or vertically.
The position of the key symbol cannot offset more than 0.2mm horizontally or vertically.
*No more than 2 defects visible are allowed on one surface (viewing at 50 cm)
*Distance between defects is allowed 50 mm (viewing at 50 cm)

Bluetooth RC(HID) Key code Table

No.	Key used	Icon of button	IR key code NEC CID:027D	BLE ke code	ID
1	Power		0x46	0x07-0x0066	
2	VOICE		0xa0	0x0c-0x0221	
3	Up		0x48	0x07-0x0052	
4	Left		0x4e	0x07-0x0050	
5	OK(Select)		0x4a	0x07-0x0058	
6	Right		0x49	0x07-0x004f	
7	Down		0x4d	0x07-0x0051	
8	Back		0x0d	0x07-0x00f1	
9	Home		0x9f	0x0c-0x0223	
10	Menu		0x45	0x0c-0x0040	
11	REWIND		0x16	0x0c-0x00b4	
12	Play/Pause		0x5b	0x0c-0x00cd	
13	FAST/FORWARD		0x17	0x0c-0x00b3	
14	Volume+		0x0c	0x0c-0x00e9	
15	Channel+		0x0f	0x0c-0x009c	
16	Volume-		0x19	0x0c-0x00ea	
17	Guide		0x14	0x0c-0x008d	
18	Channel-		0x5a	0x0c-0x009d	
19	MUTE		0x4c	0x0c-0x00e2	
20	Settings		0x96	0x0c-0x0033	
21	Recents		0xb1	0x0c-0x0002	
22	Partner Button 1	prime video	0xa1	0x09-0x00a1	
23	Partner Button 2	NETFLIX	0x5f	0x09-0x00a2	
24	Partner Button 3	DIRECTV	0xa2	0x09-0x00a3	
25	Partner Button 4	peacock	0xa3	0x09-0x00a4	

Printing and Button Color

RC Operation

Demo mode and User mode

1. The remote should by default work in the Demo mode. IR is working but the user cannot use the voice button.
2. If the user selects “Demo Mode” from the first page of the TV host, the remote will stay in IR mode. 7.1.3 If the user selects the “Home Mode”, if the remote is paired already, it will get into the WIFI configuration directly. Otherwise, the user needs to press the “Home” key once or the “Home” key for 9 seconds depending on the state to pair. The Power key will stay the IR protocol when the TV is in the home mode, it will always send the IR code. 7.1.4 Once it is paired, the host will get into the WIFI setting page.

Pair
Press the Home button for 9 seconds, release the button, and the remote control begins to send broadcasting. After pairing with the host the remote control should be able to control the host.

BTW:

- **A:** When you do the pairing, make sure that the host is turned on, and it is in pairing mode, and make the remote control close the host as close as possible.
- **B:** If the host is not paired with the host within 1 minute, please check and confirm that the host side is in the pairing mode. After confirmation, repeat the A pairing operation.

Unpair Press the Left+ Back+Option button at the same time for 12 seconds, release the button, and the remote clears the existing pairing information and begins to send a pair broadcast and enter into demo mode.

Voice
After pressing the voice button, the remote controller begins to transmit the voice. (When using the voice function, you should try to keep the remote control MIC close to the sound source.)

FCC

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

   This transmitter must not be co-located or operating in conjunction with any other

   antenna or transmitter.

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, under 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 by 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 the receiver.
- Connect the equipment to 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.

The device has been evaluated to meet general RF exposure requirements. The device can be used in portable exposure conditions without restriction. This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s). Operation is subject to the following two conditions:

1. This device may not cause interference.
2. This device must accept any interference, including interference that may cause undesired operation of the device.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter. The device has been evaluated to meet general RF exposure requirements. The device can be used in portable exposure conditions without restriction.

FAQ’s

How long does the battery last?

The Remote Control's battery life is more than 12 months.

What are the LED lights for?

The Remote Control has 2 IR LED lights and 1 RGB LED light. The specific usage of these LED lights is not provided in the user manual.

Documents / Resources

	Shenzhen C D RF565A Bluetooth Low Energy Remote Control Unit [pdf] User Manual RF565A Bluetooth Low Energy Remote Control Unit, RF565A, Bluetooth Low Energy Remote Control Unit, Energy Remote Control Unit, Remote Control Unit

References

- User Manual