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C and D ERF3C84H Remote Control

Product Specifications

- **Model:** ERF3C84H(1344)
- **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)
- **Bluetooth Specification:** Bluetooth V4.2 Low Energy (BLE)
- **Unit Weight and Dimension:** 38.16 x 158.03 x 17 mm

Product Usage Instructions

Power Supply:

Insert 2 AAA alkaline batteries into the remote control following the polarity markings inside the battery compartment.

Pairing:

To use the remote control, it needs to be paired with a compatible Host Device, such as Amazon Fire TV. Refer to Section 2.11 of the manual for detailed pairing procedures.

Operation Modes:

The remote control can operate in Normal Operation Mode or Sleep Mode. In Normal Operation Mode, it sends HID Key codes to the Host Device when a key or Voice Control operation is triggered. In Sleep Mode, pressing any key wakes up the remote control and reconnects it with the Host Device within 500ms.

Hardware and Software Version:

Refer to the manual for information on the hardware version, software version, and specific settings of the remote control.

Introduction

Scope

This document specifies the technical specifications of the Bluetooth Low Energy Remote Control Unit based on the A624KO 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 are 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 Host Device (Amazon Fire TV) before it can be used. The details pairing procedures can be found in Section 2.11.

Operation modes:

RC can enter 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 waken up and re-connected with 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: RF565D-RTK-V3.5
- Out-of-box FW Ver. and Setting:

FW Ver.	SKUID	IRID	PID

Sunflower_FW18	**0x0227**	**0x0001**	**0x0435**

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 A624KO
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, Guide, 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 LED
PCB	2-layer/FR4
SW	Sunflower_FW18

Plastic Material	– No PCR resin requirement, – Material spec benchmark: ABS 758 Equivalent
	1. Requirements – UL94 Flame Class Compliance: HB (1.2mm ~ 6mm), HWI (1.5 mm – 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 : MT1150 0 main surfaces, SPI-A2, Lens area, battery surround BC : MT1 1500, SPI-A2, Eject Icon

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 wideband 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); Electromagnetic 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

<table>
<tr><th>SN</th><th>Test Item</th><th>Requirement</th><th>Test Condition</th></tr>
<tr><td>2.1</td><td>Control Distance(RF)</td><td>≥10m for Key operation
≥10m for Voice Control</td><td>Test in the shielded room. Use BT Dongle as HOST device, pairing with Remote Control (EUT). Tested with new 2x AAA batteries, or 3V DC supply. Press the key and observe the responses on the PC screen and LED blinking on BT dongle.</td></tr>
<tr><td>2.2</td><td>Operation Power Supply Range</td><td>DC 2.2V ~ 3.3V</td><td>All the main functions (Key, Voice) of RC should be operating correctly within the defined supply Voltage Range (DC power Supply Source).</td></tr>
<tr><td>2.3</td><td>Current Consumption in Power models</td><td>w 50uA (typical) @ Connected Idle (TV Session)
w 2.5mA (Max) @ Short Button Press (BLE)
w 22mA (Max) @ Voice Operation</td><td>RC is powered by 3V external DC power supply (connected through a 10Ω resistor to simulate the internal impedance of battery), Measure the average power supply current with a multi-meter in each of the power model.</td></tr>
<tr><td>2.4</td><td>Current Consumption in Sleep Standby with host off</td><td>≤20uA</td><td>RC is powered by external 3V DC power supply (connected through a 10Ω resistor to simulate the internal impedance of 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>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 Input and Output ports of the MCU.</td></tr>
<tr><td>2.7</td><td>Battery Life time</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>

2.8	TX Power	-12dBm ≤TX Power ≤3dBm	◆ Test Method: Radiated method. ◆ Test equipment: Lite Point 8852B. ◆ Test channels:2402MHz, 2442MHz, 2480MHz. ◆ Test point: Feed point of Antenna and its matching network (Note: in mass production, the antenna and its matching network need to be kept connected for continuous production). ◆ TX test: EUT (RC) transmits data packets, Lite Point receives the packets and measure the RF performance. ◆ RX Sensitivity test: Lite Point transmits data packets at a TX power of -70dBm, EUT (RC) receive the data packets and measure the BER via serial interface test points, BER shall not be more than 0.1%.
2.9	Initial Frequency error tolerance (f0)	-75KHz≤ f0≤75KHz	
2.10	RX Sensitivity	≤-70dBm @BER=0.1%	
2.11	Pairing Success Rate:	≥99%	To be tested in RF shielding room. RC is pairing with Host Device in a distance within 1 meter. 1) Virgin Pairing: ◆ Pre-condition: RC is Virgin and Pairing table is empty; ◆ On a Virgin RC, press "Home" key for 9s, the RC will enter into Advertising mode and execute pairing. A success Pairing can also be verified by RC controlling Host Device. ◆ In case the pairing is unsuccessful, the RC will discard all the data during pairing, exit from Advertising mode, clear the pairing table and go back to the Virgin mode. ◆ Repeat above procedures if another pairing is needed. 2) Re-Pairing: ◆ Pre-condition: RC is paired with a Host Device before. ◆ Press "LEFT+BACK+OPTION" combi-key for 12s, the RC will clear the old pairing table, and then enter into Advertising mode and execute pairing. A success Pairing can also be verified by RC controlling Host Device. ◆ In case the pairing is unsuccessful, the RC will discard all the data during pairing, exit from Advertising mode, clear the pairing table and go back to the its original status. Repeat 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 second to wake up from STR mode.
2.13	Re-connection Time	≤ 4-5s	When RC is in Sleep Standby (with host off), triggering any key, RC shall be re-connected with Host 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 stronger than -90dBm.	Testing at Neusoft connectivity testing lab required This chart is for the reference test: 

EMC/EMI/ESD/Safety Certifications

SN	Certification/ Test Item	Regulation Authorities	Regulation Standards
5.1	ESD	IEC / ETSI	IEC 61000-4-2: 2008 / EN 61000-4-2: 2009 – Electromagnetic compatibility (EMC) – Part 4-2: Testing and measurement techniques – Electrostatic discharge 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 an d communication technology equipment – Part 1: Safety requirements (or latest amendment) –EN 62479 Assessment of the compliance of lo w power electronic and electrical equipment wit h the basic restrictions related to human expos ure to electromagnetic fields (10 MHz to 300 G Hz) (or latest amendment) **ERM/EMC:** ETSI EN 301 489-1 V2.1.1 (2017-02) Electro M agnetic Compatibility (EMC) standard for radio equipme nt and services;

			Part 1: Common technical requirements; Harmonised Standard covering the essential re quirements of article 3.1(b) of Directive 2014/53/EU and the essential requirements of article 6 of Directive 2014/30/EU (or latest ame ndment) ETSI EN 301 489-17 V3.1.1 (2017-02) Electro Magnetic Compatibility (EMC) standard for radio equipme nt and services; Part 17: Specific Conditions for Broadband Dat a Transmission Systems; Harmonised Standard 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 syste ms; Data transmission equipment operating in the 2 ,4 GHz ISM band and using wideband modulati on techniques; Harmonised Standard covering the essential re quirements of Article 3.2 of the Directive 2014/53/EU (or latest amendment)
5.3	BQB	Bluetooth SIG	Bluetooth V5.0 Low Energy Specifications

Note:

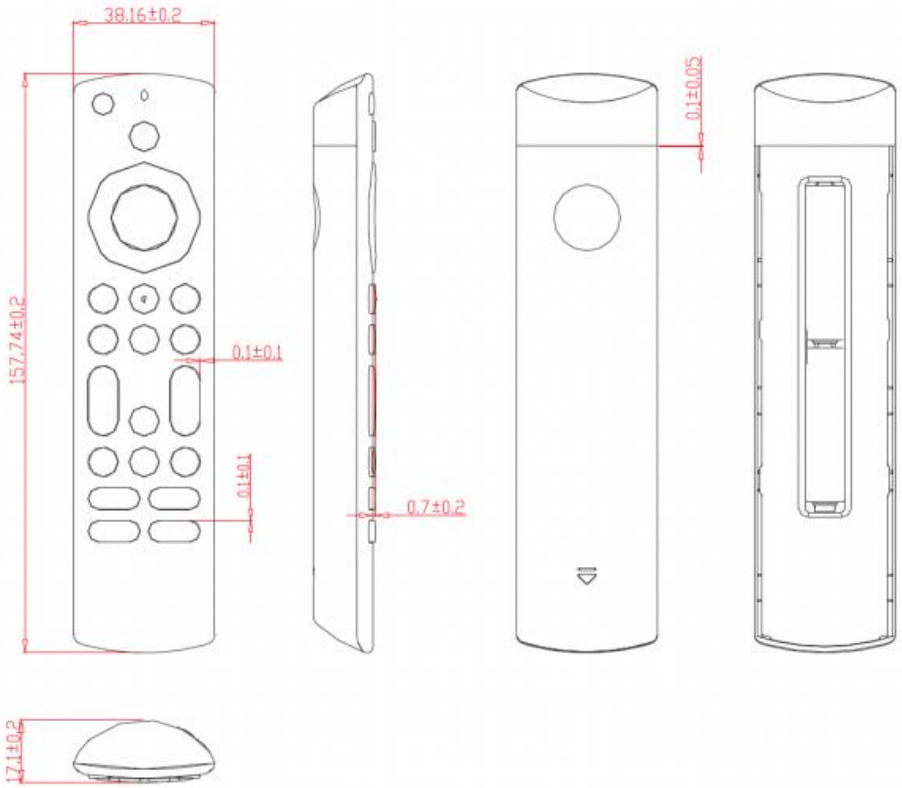
- The specific regulatory certifications depend on the individual region where the product will be marketed.
- The regulation standards could be changed at any time by different regulative authorities, so please check the details of newest official regulation standards at the beginning of each certification process.
- The Remote Control Unit must be labeled with the Approved ID numbers according to the specific requirements of individual regulatory authorities.
- Declaration Statement of Conformity must be included in the user manual of 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 be offset more than 0.2mm horizontally or vertically.
- *No more than 2 defects visible are allowed on one surface (viewing at 50 cm)
- *The distance between defects is allowed 50 mm (viewing at 50 cm)

Bluetooth RC(HID) Key Code Table

序号	按键名称	红外(NEC)			蓝牙	备注
		系统码	键值	Usage Page	Usage data	ERF3C84H(1344) V1.1
1	Power	027D	0x46	07	0x66	S7
2	Alexa	027D	0xA0	0C	0x0221	MIC
3	Up	027D	0x48	07	0x52	
4	Down	027D	0x4D	07	0x51	
5	Left	027D	0x4E	07	0x50	
6	Right	027D	0x49	07	0x4F	
7	OK (Select)	027D	0x4A	07	0x58	
8	Back	027D	0x0D	07	0xF1	
9	Home	027D	0x9F	0C	0x0223	
10	Menu	027D	0x45	0C	0x40	
11	Rewind	027D	0x16	0C	0xB4	FR
12	Play/Pause	027D	0x5B	0C	0xCD	
13	Forward	027D	0x17	0C	0xB3	FF
14	Volume+	027D	0x0C	0C	0xE9	Vol+
15	Volume-	027D	0x19	0C	0xEA	Vol-
16	Guide	027D	0x14	0C	0x8D	
17	Channel+	027D	0x0F	0C	0x9C	CH+
18	Channel-	027D	0x5A	0C	0x9D	CH-
19	Mute	027D	0x4C	0C	0xE2	
20	Settings	027D	0xC3	0C	0x0242	
21	Recents	027D	0xB1	0C	0x02	
22	PrimeVideo	027D	0xA1	09	0xA1	Partner Button 1
23	Netflix	027D	0x5F	09	0xA2	Partner Button 2
24	Disney+	027D	0xA4	09	0xA3	Partner Button 3
25	peacock	027D	0xA5	09	0xA4	Partner Button 4

Printing and Button Color

RC Operation

Demo mode and User mode

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

Pair

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

control the host.

BTW:

- 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.
- If the host is not paired with the host within 1 minute, please check and confirm that the host side is in 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, the remote clears the existing pairing information and begins to send a pair broadcast and enters 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's 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
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 according to instructions, can cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. Suppose this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on. In that case, 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 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 the general RF exposure requirements.
The device can be used in portable exposure conditions without restriction.

IC

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 the general RF exposure requirements. The device can be used in portable exposure conditions without restriction.

FAQ

- **How do I replace the batteries in the remote control?**
  To replace the batteries, open the battery compartment, remove the old batteries, and insert two new AAA alkaline batteries following the correct polarity.

- **How do I pair the remote control with my Amazon Fire TV?**
  To pair the remote control, follow the detailed pairing procedures provided in Section 2.11 of the user manual.

Documents / Resources

	C and D ERF3C84H Remote Control [pdf] Instruction Manual ERF3C84H, 1344, ERF3C84H Remote Control, ERF3C84H, Remote Control, Control

References

- User Manual

C AND D 1344, C AND D, control, ERF3C84H, ERF3C84H Remote Control, Remote Control

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