

Huawei R22

Remote Control FRS

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1 Acronyms and Abbreviations

Table 1-1 Acronyms and abbreviations

Acronym/Abbreviation	Full Name
BLE	Bluetooth Low Energy
MIC	microphone
ECM	Electret Condenser Microphone
LED	Light Emitting Diode
OTA	Over-The-Air
CE	Conformité Européenne
ROHS	Restriction of Hazardous Substances
BQB	Bluetooth Qualification Body

2 Notice

The set top box (STB) mentioned in this document indicates the Huawei STB that matches with the Huawei R22 remote control.

3 Remote Control Appearance

Remote control appearance features:

- The operation surface adopts a belt grinding design to improve the texture.
- The rear side adopts a big radian design to improve the comfort of holding.
- The slope and highlighted edge surrounding the voice key makes the key distinct.
- The keys are properly laid out. Keys in the upper area are rarely used, keys in the middle area are most often used, and keys in the lower area are also often used but not as frequent as those in the middle area.
 - The middle area is the major operation area. Keys in this area use meta domes, which make people feel comfortable when they press the keys.

Figure 3-1 Huawei R22 remote control appearance



4 Software Functions

4.1 Function Description

Table 4-1 R22 remote control functions

Function	Description	Restriction and Impact
Work mode	<p>The remote control supports infrared (IR) and Bluetooth modes.</p> <p>When the remote control works in IR mode and you press keys on the remote control, IR key values are sent.</p> <p>When the remote control works in Bluetooth mode and you press keys (except those in the study window) on the remote control, Bluetooth key values are sent. (When you press keys in the study window, IR key values are sent.)</p>	<ul style="list-style-type: none">• When used for the first time, the remote control works in IR mode by default, and it is not paired with an STB through Bluetooth.• After being paired with an STB through Bluetooth, the remote control starts to work in Bluetooth mode.• When the remote control works in Bluetooth mode, you can operate only the paired STB using the remote control.• Before connecting the remote control to a new STB, you need to reset the remote control.

Function	Description	Restriction and Impact
Study function	<ol style="list-style-type: none"> 1. Press and hold the STUDY key for about 3 seconds. If the indicator is steady on, the remote control enters the study state. 2. Press the sleep/wake key in the study window on the remote control within 10 seconds. The indicator blinks. 3. Align the upper end of the STB remote control with that of the TV remote control within a distance of 3 centimeters. Press and hold the sleep/wake key on the TV remote control for about 3 seconds. If the indicator is steady on after blinking for three times, the study is successful. 4. Repeat steps 2 and 3 to study the volume and TV/AV keys. 5. Press the STUDY key to save the study result and exit the study state. 	<ul style="list-style-type: none"> • The study function is applicable only to the IR mode. • The Bluetooth and IR functions are unavailable when the remote control is in study state.
Sound pickup	<p>When you press the voice key on the remote control in Bluetooth mode, the remote control starts to pick up sounds. When you release the key, the remote control stops picking up sounds.</p>	<p>The remote control provides only the sound pickup capability, but not voice search, which is an upper-layer service of the STB.</p>
Battery monitoring	<p>When the battery level is low, the remote control indicator blinks to alert you, and the remote control reports a low-battery event to the STB. Then the STB displays a low-battery notification.</p>	<p>N/A</p>
OTA upgrade	<p>The STB upgrades the remote control firmware through Bluetooth. Both mandatory and optional upgrades are supported, which can be customized. Subscribers can cancel the upgrade only in optional mode.</p>	<p>If the battery level of the remote control is low or the Bluetooth connection between the remote control and the STB is not set up, the remote control firmware cannot be upgraded. The upgrade takes about 3 minutes, during which the system does not respond to key pressing and voice requests.</p>

Function	Description	Restriction and Impact
Reset	Press the OK + CH+ keys for more than 5 seconds to restore the default settings and clear the Bluetooth pairing information and STUDY key information. The indicator on the remote control blinks for four times during the reset.	<ul style="list-style-type: none">• After the remote control is reset, the Bluetooth connection information is automatically cleared. Next time you use the remote control to operate the STB, the remote control sets up a Bluetooth connection with the STB again. It takes longer time to set up a Bluetooth connection after the reset.• If you remove the remote control battery, the Bluetooth pairing information will not be cleared.

4.2 Pairing Process

Figure 4-1 Pairing an R22 remote control with an STB

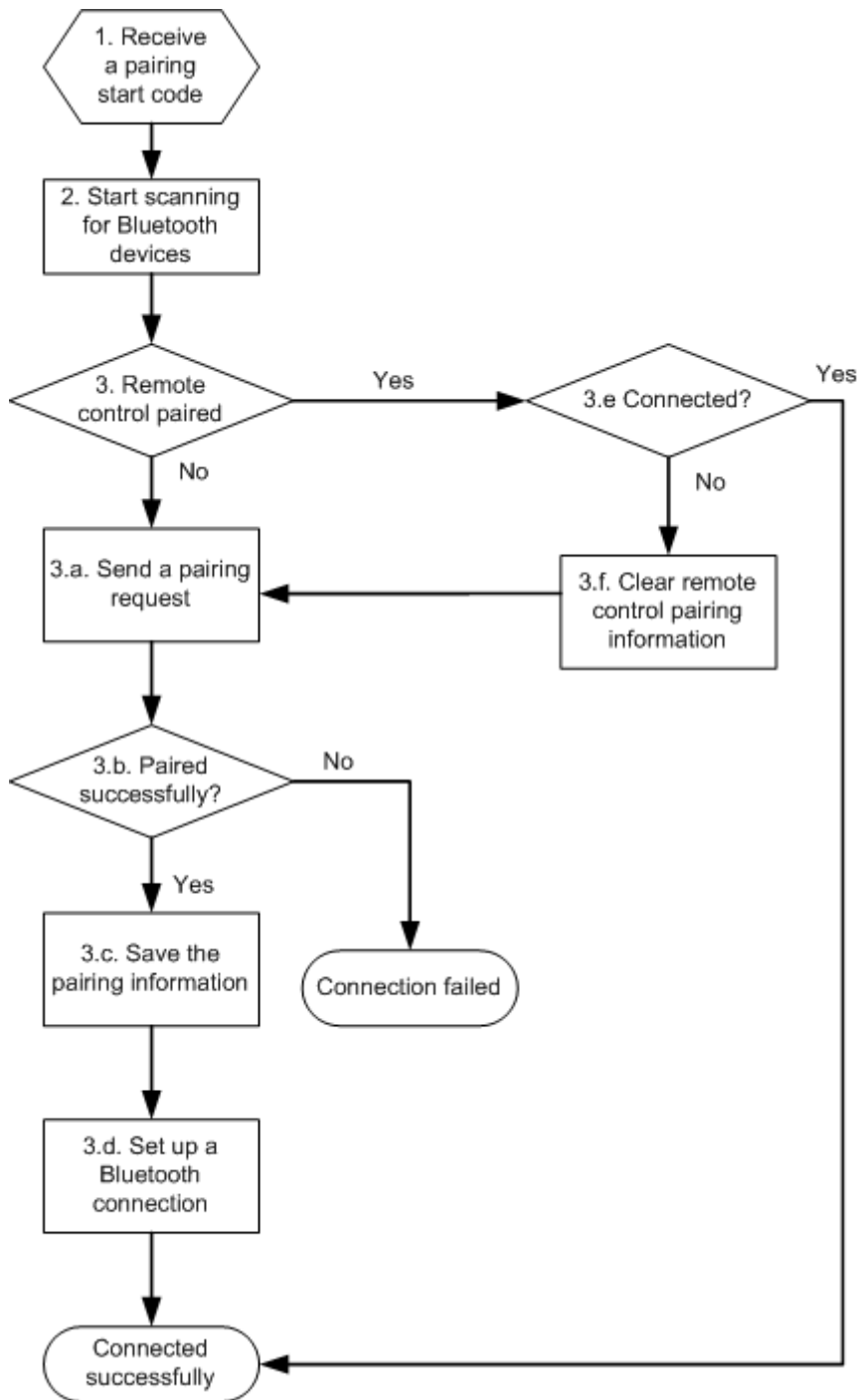


Figure 4-1 shows the process of pairing an R22 remote control with an STB. The process is described as follows:

1. When the R22 remote control works in IR mode and the subscriber presses the home + menu keys on the remote control, the remote control sends a pairing startup code through IR to the STB. The STB receives the pairing startup code.
2. The STB scans for Bluetooth devices and detects the remote control.
3. The STB checks its pairing list for the R22 remote control. If the remote control is not on the pairing list, substep 3.a through 3.d are performed. If the remote control is on the pairing list, 3.e is performed.
 - a. If the STB does not have the pairing record of the R22 remote control, the STB sends a pairing request.
 - b. The STB waits for a pairing response from the R22 remote control and determines whether the pairing succeeds.
 - c. If the pairing succeeds, the STB saves the R22 remote control information.
 - d. After the STB and the R22 remote control are paired, the STB proactively sets up a Bluetooth connection with the R22 remote control.
 - e. If the STB already contains the pairing record of the R22 remote control, the STB checks whether the R22 remote control is connected. If the connection fails, the STB clears the pairing information of the R22 remote control and then goes to 3.a to initiate a pairing request.

4.3 Sound Pickup Principle

Figure 4-2 Sound pickup

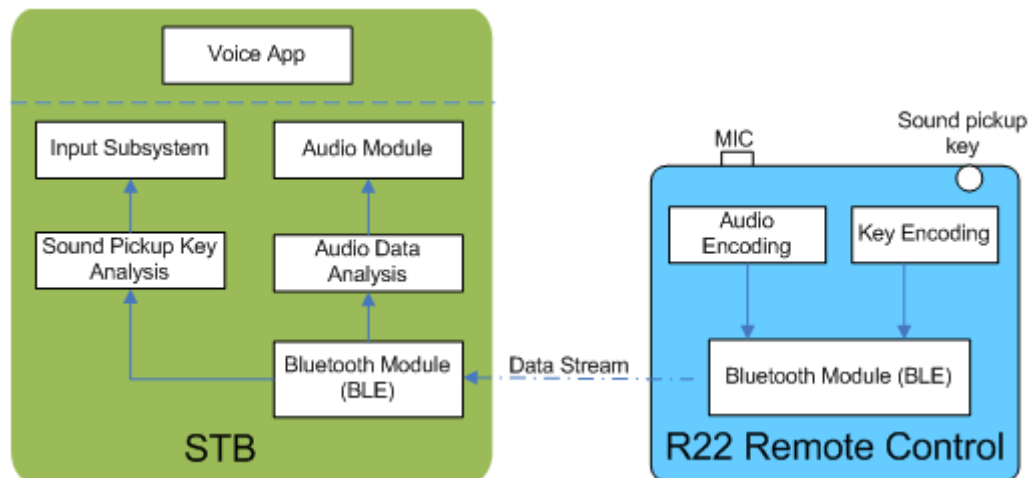


Figure 4-2 shows the process of sound pickup through the R22 remote control. The process is described as follows:










1. When a subscriber presses the voice key on the R22 remote control and speaks to the microphone (MIC), the MIC collects voice data, the Audio encoding module encodes the voice data, and sends the data to the Bluetooth module of the R22 remote control.
2. The Bluetooth module of the R22 remote control sends the voice key value and voice data to the Bluetooth module of the STB using the BLE protocol.

3. The Bluetooth module of the STB parses the audio data, sends the data to the Audio module, parses the voice key value, and sends the parsed data to the Input subsystem of the STB.
4. After receiving the voice key press event, the voice app installed in the STB proactively obtains the voice data from the Audio module of the STB. When the voice key is released, the remote control stops collecting voice data.

4.4 Key Value Table

This section describes the values of the remote control keys.

Table 4-2 Key value table

Key	HID Type	HID Command	IR Key Value
Sleep/Wake (for study)	N/A	N/A	-
STUDY	N/A	N/A	-
TV/AV (for study)	N/A	N/A	-
Volume+ (for study)	N/A	N/A	-
Volume- (for study)	N/A	N/A	-
Sleep/Wake	Keyboard (0x07)	0x66	0xDC
Sound channel 	Consumer (0x0C)	0x1b7	0x98
Mute 	Keyboard (0x07)	0x7F	0x9C
Settings 	Consumer (0x0C)	0xF6	0x8D
Quick back 	Consumer (0x0C)	0x083	0xD6
Red (reserved for extending functions)	Consumer (0x0C)	0x305	0x84
Green (reserved for extending functions)	Consumer (0x0C)	0x306	0x89
Yellow (reserved for extending functions)	Consumer (0x0C)	0x307	0xD9
Blue (reserved for extending functions)	Consumer (0x0C)	0x060	0x96
Live TV 	Consumer (0x0C)	0x069	0xCD
Catch-up TV 	Consumer (0x0C)	0x06a	0x91
VOD 	Consumer (0x0C)	0x06c	0x83
Info 	Consumer (0x0C)	0x06b	0xC3
Rewind VOD/TSTV 	Consumer (0x0C)	0xB4	0x9B

Key	HID Type	HID Command	IR Key Value
Stop/Exit playback ■	Keyboard (0x07)	0xF3	0xC7
Play/Pause ▶	Consumer (0x0C)	0xCD	0x95
Fast-forward VOD/TSTV ▶▶	Keyboard (0x07)	0xF2	0xC2
Page up ◀◀	Keyboard (0x07)	0x4B	0xDD
Page down ▶▶	Keyboard (0x07)	0x4E	0x8C
Sound pickup	Keyboard (0x07)	0x3E	N/A
Home 🏠	Keyboard (0x07)	0x4A	0x88
Local ☆ (reserved for extending functions)	Consumer (0x0C)	0x221	0x65
Back ↶	Keyboard (0x07)	0x29	0xC5
Menu ☰	Consumer (0x0C)	0x40	0x82
Up	Keyboard (0x07)	0x52	0xCA
Down	Keyboard (0x07)	0x51	0xD2
Left	Keyboard (0x07)	0x50	0x99
Right	Keyboard (0x07)	0x4F	0xC1
OK	Keyboard (0x07)	0x28	0xCE
Volume+	Keyboard (0x07)	0x80	0x80
Volume-	Keyboard (0x07)	0x81	0x81
Channel+	Consumer (0x0C)	0x9C	0x85
Channel-	Consumer (0x0C)	0x9D	0x86
PIP/Subtitle 🖼	Consumer (0x0C)	0x309	0x63
Netflix shortcut key/Teletext 📺	Consumer (0x0C)	0x308	0x64
0	Keyboard (0x07)	0x27	0x87
1	Keyboard (0x07)	0x1E	0x92
2	Keyboard (0x07)	0x1F	0x93
3	Keyboard (0x07)	0x20	0xCC
4	Keyboard (0x07)	0x21	0x8E
5	Keyboard (0x07)	0x22	0x8F
6	Keyboard (0x07)	0x23	0xC8

Key	HID Type	HID Command	IR Key Value
7	Keyboard (0x07)	0x24	0x8A
8	Keyboard (0x07)	0x25	0x8B
9	Keyboard (0x07)	0x26	0xC4
*	Consumer (0x0C)	0x303	0xDA
#	Consumer (0x0C)	0x304	0xD0
Pairing request (no key)	N/A	N/A	0x77
Low-battery alert (no key)	Keyboard (0x07)	0x73	0x6E



NOTE

The keys reserved for extending functions support customization, and adaptation development is required for the EPG and STB.

5 Hardware Functions

This chapter describes hardware functions of the R22 remote control.

Table 5-1 Hardware specifications

Category	Parameter	Description	Application Limitation
Wireless connection	Bluetooth mode	<ul style="list-style-type: none">• Bluetooth 4.2 standards are complied with.• Only the BLE protocol is supported.	The distance between the STB and remote control is less than or equal to 12 meters.

Category	Parameter	Description	Application Limitation
	IR mode	Protocol: NEC Frequency: 37.9 kHz NOTE The STUDY key supports only the IR mode.	<ul style="list-style-type: none"> • The straight remote control distance is less than or equal to 10 meters. • The limitations on the distance at different angles are as follows: <ul style="list-style-type: none"> – When the STB rotates 60 degrees horizontally or vertically, the remote control distance is less than or equal to 8 meters. – When the remote control rotates 45 degrees horizontally or vertically, the remote control distance is less than or equal to 4 meters.

Category	Parameter	Description	Application Limitation
MIC	Sound pickup	Built-in ECM MIC.	<ul style="list-style-type: none"> The remote control only collects and transmits voice data. The voice recognition success rate of the STB depends on the sound pickup on the remote control, the upper-layer voice software, and the cloud voice platform. The effective sound pickup distance of the MIC is less than or equal to 10 centimeters.
Key	Key count	<p>There are 52 keys.</p> <p>NOTE For details about the key layout and description, see the remote control or STB user manual.</p>	A key can be pressed for a maximum of 300,000 times.
	Key combination	<ul style="list-style-type: none"> Press the OK + CH+ keys to reset the remote control. Press the home + menu keys to pair the remote control with a Bluetooth device. 	N/A

Category	Parameter	Description	Application Limitation
Indicator	Indicator	<ul style="list-style-type: none"> • The red LED lamp is used. • Blinking mode and duration of the LED indicator in different scenarios: <ul style="list-style-type: none"> – In IR mode: When a key (except the voice key) is pressed, the indicator blinks (at an interval of 300 ms); when the key is released, the indicator is off. – In Bluetooth mode: When a key (except the voice key) is pressed, the indicator blinks (at an interval of 300 ms); when the key is released, the indicator is off. When the voice key is pressed, the indicator blinks (at an interval of 150 ms); when the voice key is released, the indicator is off. – When the remote control starts pairing, the indicator blinks (at an interval of 500 ms). When the pairing is complete (successful or failed), the indicator is off. – When the remote control starts to connect to the STB, the indicator blinks (at an interval of 300 ms). When the connection fails, the indicator is off. When the connection succeeds, the indicator is steady on for 1s and then off. – When the OK + CH+ keys are pressed, the indicator is not on. When the remote control is reset, the indicator blinks for four times (at an interval of 500 ms). – When the battery level is lower than the undervoltage threshold, the indicator blinks (on for 1s, off for 1s, and blinking for five times). 	N/A
Compatibility	Bluetooth function compatibility	The following STB model has been adapted: Q22E	If an STB model that needs to be used is not on the compatibility list, submit an RAT workflow.

6 Physical Specifications

This chapter describes physical specifications of the R22 remote control.

Table 6-1 Physical specifications

Parameter	Specification
Dimensions	210 mm x 47 mm x 21 mm
Weight	About 90 g (without batteries)

7 Environmental Requirements

This chapter describes the operating and storing environment requirements for the R22 remote control.

Table 7-1 Operating and storing environment requirements for the R22 remote control

Category	Requirement	Application Limitation
Operating temperature	0°C to 40°C (32°F to 104°F)	Use the remote control in an environment that meets the temperature and humidity requirements. A temperature higher than 40°C or lower than 0°C may cause faults.
Operating humidity	5% RH to 95% RH (no condensing)	
Storage temperature	-40°C to +70°C (-40°F to +158°F)	N/A
Storage humidity	5% RH to 95% RH (no condensing)	
Moisture protection	Place the remote control in a clean and dry environment.	<ul style="list-style-type: none"> Keep the remote control from rains and other sources of water. Prevent foreign objects or liquids from entering the remote control. Otherwise, STB faults or other faults may occur.
EMI protection	Keep the remote control far from other electronic and magnetic devices.	<ul style="list-style-type: none"> Place the remote control far away from other electronic devices with strong magnetic or electric fields, such as cable modems with wireless functions, cordless phones, Wi-Fi routers, power line communication modems, mobile phones, microwave ovens, and fridges. Use the remote control at positions with good network signals. The distance between the remote control and other metal objects (such as metal supports, metal doors, and metal windows) must be over 25 centimeters. The distance between the remote control and other electronic devices must be over 30 centimeters.

Category	Requirement	Application Limitation
Water protection	The remote control is not waterproof.	N/A
Battery	Use the batteries in a proper way.	<ul style="list-style-type: none">• Remove the batteries if you will not use the remote control for a long time. This is to prevent the remote control from being corrupted by battery leakage.• Use the batteries that comply with national standards.

8 Product Certification

This chapter lists the certifications that the R22 remote control has passed.

Table 8-1 Certification list

Item	Description
Bluetooth	BQB certification
CE	European EMC/Safety/RF/RoHS/REACH/WEEE certification

9 Packing List

There are two scenarios for the R22 remote control:

- Without an independent packing: Packed with an STB as an accessory. For details about the packing list, see the corresponding STB FRS and STB user manual.
- With an independent packing: Packed as an independent product for sale.

Table 9-1 Packing list

No.	Item	Standard or Optional	Quantity
1	Remote control	Standard	1
3	Product manual	Standard	1
4	Battery	Standard	2


 **NOTE**

Because there is no BOM code, the R22 remote control does not have an independent packing for sites outside China. If an independent packing is required, submit an RAT workflow.

10 Appendix

This chapter lists attachments related to this document.

Table 10-1 Attachment list

No.	Attachment	Description
1	 Attachment 01 Huawei R22 Remote	Includes six views and 360-degree appearance images of the Huawei R22 remote control.