

# RK1109 and YC1175 serial communication commands

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## 1. Overview

### 1.1 Scope of Application

### 1.2 Serial communication parameters

## 2. Frame Format

## 3. Protocol Commands

### 3.1 RK1109 check the Firmware version of YC1175

### 3.2 RK1109 check the Firmware version of YC1175

### 3.3 YC1175 report button events

### 3.3 RK1109 control the state of the LED

### 3.4 YC1175 report the state of the LED

### 3.5 RK1109 can broadcast Identity Information to the environment through YC1175

### 3.6 YC1175 check the state of the LED

## 4. OTA Command Set

### 4.1 RK1109 send an upgrade request

### 4.2 RK1109 send the firmware data

### 4.3 RK1109 notify the end of firmware send, firmware check can be done

### 4.4 YC1175 report upgrade result

## 1. Overview

### 1.1 Scope of Application

This document specifies the RK1109 and YC1175 serial communication commands in the Sonoff iHost system.

### 1.2 Serial communication parameters

Baud Rate: 115200

Data Bits: 8

Parity Bits: None

Stop Bits: 1

Data Flow Control: None

## 2. Frame Format

Field	Byte	Description
Frame Header	1	Fixed as 0xFE
Data Frame Length	2	Frame Length, The length from Frame Header to Frame Check Sequence, Value Range [0, 4096+8]
Types of commands	1	Value: 0x00–Request; 0x40–Respond; 0x80–Notification; Others–RFU
Command Code	1	Specific Command Code
Frame Number	1	Every frame accumulates 1, retransmits, and filters duplicate data
Data	N	Valid Data
Verification	2	CRC16 Verification from the 'Frame Header' to 'Data'(included), using the CCITT–CRC16 algorithm

- Data larger than 1 byte is in Big–Endian transmit mode.
- The body that receives the request frame(0x01) must return the response frame(0x40), while

no response for the notification frame(0x80). For example:

### Request Frame

Field	Frame Header	Length	Types of Commands	Command Code	Frame Number	Data	Verification
Byte	1	2	1	1	1	0	2
Content	0xFE	0x0008	0x00	0x01	0x88	-	0x0D41

### Response Frame

Field	Frame Header	Length	Types of Commands	Command Code	Frame Number	Error Code	Command parameters	Verification
Byte	1	2	1	1	1	1	N	2
Content	0xFE	N+9	0x40	0x01	0x88	0x00		

- Error Code[0, 0x40]: Generic Code. Error Code[0x41, 0xFF]: Error Codes for Specific Command.

1.0x00– Succeed.

2.0x01– The Frame Length is out of range.

3.0x02– CRC check error.

4.0x03– No support for the Command.

5.0x04– The format of Command data is abnormal.

6. 0x05– The content of Command data is illegal.

7. 0x06– Timeout for Command execution time.

### Notification Frame

Field	Frame Header	Length	Types of Commands	Command Code	Frame Number	Data	Verification
Byte	1	2	1	1	1	N	2
Content	0xFE	N+8	0x80	0xE0	0x88		

### 3. Protocol Commands

#### 3.1 RK1109 check the Firmware version of YC1175

RK1109 request:

Field	Frame Header	Length	Types of Commands	Command Code	Frame Number	Data	Verification
Byte	1	2	1	1	1	0	2
Content	0xFE	0x0008	0x00	0x01	0x88	-	0x0D41

YC1175 respond:

Field	Frame Header	Length	Types of Commands	Command Code	Frame Number	Error Code	Major Version	Minor Version	Maintenance Version	Verification
Byte	1	2	1	1	1	1	1	1	1	2
Content	0xFE	0x000C	0x40	0x01	0x88	0x0000	0x01	0x00	0x00	0x7E77

- After powering on the device, RK1109 will confirm the YC1175 initialization is finished through

this Command.

- RK1109 will finish the heartbeat monitoring through this Command when the device works normally.
- Error codes are described in Section 2 General Error Codes.

### 3.2 RK1109 check the Firmware version of YC1175

YC1175 request:

Field	Frame Header	Length	Types of Commands	Command Code	Frame Number	Data	Verification
Byte	1	2	1	1	1	0	2
Content	0xFE	0x0008	0x00	0x02	0x88	-	

RK1109 respond:

Field	Frame Header	Length	Types of Commands	Command Code	Frame Number	Error Code	Major Version	Minor Version	Maintenance Version	Verification
Byte	1	2	1	1	1	1	1	1	1	2
Content	0xFE	0x000B	0x40	0x02	0x88	0x00	0x01	0x00	0x00	0x720A

- After powering on the device, YC1175 will confirm the RK1109 initialization is finished through this Command.
- Error codes are described in Section 2 General Error Codes.

### 3.3 YC1175 report button events

YC1175 request:

Field	Frame Header	Length	Types of Commands	Command Code	Frame Number	Button Number	Button Trigger Type	Button Trigger Parameter	Verification
Byte	1	2	1	1	1	1	1	2	2
Content	0xFE	N+12	0x00	0x03	0x89				

- Button Num Value

1. 0x00–Power Button;
2. 0x01–Pairing Button;
3. 0x02–Security Button;
4. 0x03–Music Rhythm Button;
5. 0x04–Reset Button;
6. 0x05–Music Rhythm+Security Button;
7. Others–RFU

- Button Trigger Type

1. 0x00–Single Click;
2. 0x01–Double Click;
3. 0x02–Long Press;
4. Others–RFU

- Button Trigger Parameter

1. Long Press stands for Trigger Time, and the unit is second. Only 3s and 10s are supported.
2. The non–long press is reserved but meaningless.

RK1109 respond:

Field	Frame Header	Length	Types of Commands	Command Code	Frame Number	Data	Verification
Byte	1	2	1	1	1	1	2
Content	0xFE	0x0009	0x40	0x03	0x89	0x00	0xE213

- Error codes are described in Section 2 General Error Codes.

### 3.3 RK1109 control the state of the LED

RK1109 request:

Field	Frame Header	Length	Types of Commands	Command Code	Frame Number	Data	Verification
Byte	1	2	1	1	1	N	2
Content	0xFE	N+8	0x00	0x04	0x89		

- Data Field stands for the specific LED Num, Mode, and Parameter. Support simultaneous controlling of 1 or more LEDs. The format is as follows:

1st LED Num	1st LED Mode	1st LED Parameter	...	Nth LED Num	Nth LED Mode	Nth LED Parameter
1 byte	1 byte	3 bytes	...	1 byte	1 byte	3 bytes
			...			

- LED Num Value:
  1. 0x00–Power Button Indicator;
  2. 0x01–Pairing Button Indicator;
  3. 0x02–Security Button Indicator;
  4. 0x03–Music Rhythm Button Indicator;
  5. 0x04–Marquee LED;

6. Others–RFU;

- LED Mode :

1. 0x00–Close;

2. 0x01–Open;

3. 0x02–Fast Flashing;

4. 0x03–Periodic Double Flashing;

5. 0x04–Breathing;

6. 0x05–Marquee;

7. 0x06–Single Double Flashing;

8. 0x07–Production Measurement Mode;

9. Others–RFU.

- LED Parameter :

1. When the LED Num is 0x04, the three bytes stand for Red–Value、Green–Value、Blue–Value in turn, value range[0, 255];

2. The others are reserved but meaningless.

YC1175 respond:

Field	Frame Header	Length	Types of Commands	Command Code	Frame Number	Data	Verification
Byte	1	2	1	1	1	1	2
Content	0xFE	0x0009	0x40	0x04	0x89	0x00	0xE213

● Error codes are described in Section 2 General Error Codes.

### 3.4 YC1175 report the state of the LED

YC1175 report:



Field	Frame Header	Length	Types of Commands	Command Code	Frame Number	Data	Verification
Byte	1	2	1	1	1	N	2
Content	0xFE	N+8	0x00	0x05	0x89		

- Data Field stands for the specific LED Num, Mode, and Parameter. Support simultaneous controlling of 1 or more LEDs. The format is as follows:

1st LED Num	1st LED Mode	1st LED Parameter	...	Nth LED Num	Nth LED Mode	Nth LED Parameter
1 byte	1 byte	3 bytes	...	1 byte	1 byte	3 bytes
			...			

- LED Num Value:
  1. 0x00–Power Button Indicator;
  2. 0x01–Pairing Button Indicator;
  3. 0x02–Security Button Indicator;
  4. 0x03–Music Rhythm Button Indicator;
  5. 0x04–Magic LED;
  6. Others–RFU;
- LED Mode:
  1. 0x00–Close;
  2. 0x01–Open;
  3. 0x02–Fast Flashing;
  4. 0x03–Periodic Double Flashing;
  5. 0x04–Breathing;
  6. 0x05–Marquee;
  7. 0x06–Single Double Flashing;
  8. 0x07–Production Measurement Mode;

## 9. Others–RFU.

- LED Parameter:

1. When the LED Num is 0x04, the three bytes stand for Red–Value、Green–Value、Blue–Value in turn, value range[0, 255];
2. The others are reserved but meaningless.

RK1109 respond:

Field	Frame Header	Length	Types of Commands	Command Code	Frame Number	Data	Verification
Byte	1	2	1	1	1	1	2
Content	0xFE	0x0009	0x40	0x05	0x89	0x00	

- Error codes are described in Section 2 General Error Codes.

### 3.5 RK1109 can broadcast Identity Information to the environment through YC1175

RK1109 can broadcast Identity Information to the environment through the BLE ADV API of YC1175, which includes DeviceId(such as '100175d59d')+MAC(such as 'd0:27:02:eb:a8:8a')+Product ID(such as '22012600002017' )

Specify that the above identity information is transferred from characters to hexadecimal, for example:

DeviceId(such as '100175d59d') transferred to hexadecimal is 0x10, 0x01, 0x75, 0xd5, 0x9d;

MAC(such as 'd0:27:02:eb:a8:8a') transferred to hexadecimal is 0xd0, 0x27, 0x02, 0xeb, 0xa8, 0x8a;

Product ID(such as '22012600002017' ) transferred to hexadecimal is 0x22, 0x01, 0x26, 0x00, 0x00, 0x20, 0x17

RK1109 request:

Field	Frame Header	Length	Types of Commands	Command Code	Frame Number	Data	Verification
Byte	1	2	1	1	1	N	2
Content	0xFE	N+8	0x00	0x06	0x89		

- The structure field consists of several Structure cells, and each Structure includes Structure Type, Structure Len, and Structure Value. The format is as follows:

Structure1 Len	Structure1 Type	Structure1 Value	Structure2 Len	Structure2 Type	Structure2 Value	structure3 Len	structure3 TYPE	structure3 Value
1 byte	1 byte	5 bytes	1 byte	1 byte	6 bytes	1 byte	1 byte	7字节
0x06	0x00	0x10, 0x01, 0x75, 0xd5, 0x9d	0x07	0x01	0xd0, 0x27, 0x02, 0xeb, 0xa8, 0x8a	0x08	0x02	0x22, 0x01, 0x26, 0x00, 0x00, 0x20, 0x17

- Structure Len is the sum of the number of bytes of Structure Type and the number of bytes of Structure Value.
- Structure Type value:
  - 0x00–DeviceId ;
  - 0x01–Mac;
  - 0x02–Product ID;
  - Others–RFU;

YC1175 respond:

Field	Frame Header	Length	Types of Commands	Command Code	Frame Number	Data	Verification
Byte	1	2	1	1	1	1	2
Content	0xFE	0x0009	0x40	0x06	0x89	0x00	

- Error codes are described in Section 2 General Error Codes.

### 3.6 YC1175 check the state of the LED

When YC1175 reset(YC1175 OTA/software reset), this Command can query RK1109 for indicator status.

YC1175 report:

Field	Frame Header	Length	Types of Commands	Command Code	Frame Number	Data	Verification
Byte	1	2	1	1	1	N	2
Content	0xFE	N+8	0x00	0x07	0x89		

- Data Field stands for the specific LED Num. Support simultaneous controlling of 1 or more LEDs. The format is as follows:

1st LED Num	2nd LED Num	...	Nth LED Num
1 byte	1 byte	...	1 byte
		...	

- LED Num Value:
  1. 0x00–Power Button Indicator;
  2. 0x01–Pairing Button Indicator;
  3. 0x02–Security Button Indicator;

4. 0x03–Music Rhythm Button Indicator;
5. 0x04–Magic LED;
6. Others–RFU;

RK1109 respond 1:

Field	Frame Header	Length	Types of Commands	Command Code	Frame Number	Error Code	Verification
Byte	1	2	1	1	1	1	2
Content	0xFE	0x0009	0x40	0x07	0x89	0x00	

- Error codes are described in Section 2 General Error Codes.

RK1109 respond 2: RK1109 sends a control LED status Command (Command code 0x04) to synchronize the status.

## 4. OTA Command Set

- The firmware to be upgraded will be pushed to the server, and the firmware version information needs to be filled in.
- When the server confirms that the pushed firmware version is newer than the firmware version reported by YC1175, the server side will push the upgrade notification to the mobile app.
- The mobile app forwards the upgrade request and firmware version information and firmware size, CRC.
- YC1175 will check the application version information of the firmware. When the application version information pushed by the App is newer than the application version of the firmware run by YC1175, YC1175 will enter the upgrade mode. Or it will exit the upgrade mode.
- The protocol supports firmware breakpoint transfer capability. YC1175 can revert the last firmware transmission that was interrupted and RK1109 will transmit continuously from the specific location.

This capability is not mandatory and can be implemented according to the situation.

Currently, this application does not support breakpoint transfer.

#### 4.1 RK1109 send an upgrade request

RK1109 request:

Field	Frame Header	Length	Types of Commands	Command Code	Frame Number	Data	Verification
Byte	1	2	1	1	1	40	2
Content	0xFE	–	0x00	0xA1	0x88	–	–

- Data Field stands for the firmware upgrade information, including:

Firmware Version	Firmware Size	Firmware SHA256	Upgrade Type
3 bytes	4 bytes	32 bytes	1 byte
Major Version + Minor Version + Maintenance Version			0–Full Upgrade 1–Incremental Upgrade

- Firmware Version: For example, 0x010204 means V1.2.4
- Upgrade Type: This application only supports full upgrade.

YC1175 respond:

Field	Frame Header	Length	Types of Commands	Command Code	Frame Number	Error Code	Length of firmware data received	Maximum length of firmware data for a single delivery	Verification
Byte	1	2	1	1	1	1	4	2	2
Content	0xFE	–	0x40	0xA1	0x88	0x000	0x00000000	0x0400	–

- **Error Code**

0x00– Upgrade request success, indicating that the RK1109 can send down firmware data.

0x41– New firmware version number ≤ Running firmware version number

0x42– New firmware size out of range.

Others– Refer to Section 2 for general error code descriptions.

- **Length of firmware data received**

Indicate that the device had received the length of data, used for the incremental upgrade.

The default in this application is 0, which means that incremental upgrades are not supported.

- **Maximum length of firmware data for a single delivery**

This application limits the length of the firmware data to a maximum of 0x0400 for a single delivery, given the limited receive cache on the serial port.

- **When the Error Code is "0x00", the "Length of firmware data received" and the "maximum length of firmware data for a single delivery" both are valid. Otherwise, these two fields are meaningless.**

## 4.2 RK1109 send the firmware data

RK1109 request:

Field	Frame Header	Length	Types of Commands	Command Code	Frame Number	Firmware Data Offset	Firmware Data	Verification
Byte	1	2	1	1	1	4	N	2
Content	0xFE	0xFE	-	0x00	0xA2	0x88	-	

- Firmware data length in this application  $\leq$  0x0400

YC1175 respond:

Field	Frame Header	Length	Types of Commands	Command Code	Frame Number	Error Code	Length of firmware data received	Verification
Byte	1	2	1	1	1	1	4	2
Content	0xFE	-	0x40	0xA2	0x88	0x000	0x0000	-

### ● Error codes

0x00– Firmware data received successfully.

0x41– Data received cannot match "Firmware Data Offset". There is data loss and the need to retransmit.

0x42– Indicates that the received data exceeds the target bin size.

### ● Length of firmware data received



The device has received the accomplished data length correctly.

### 4.3 RK1109 notify the end of firmware send, firmware check can be done

RK1109 request:

Field	Frame Header	Length	Types of Commands	Command Code	Frame Number	Verification
Byte	1	2	1	1	1	2
Content	0xFE	–	0x00	0xA3	0x88	–

YC1175 respond:

Field	Frame Header	Length	Types of Commands	Command Code	Frame Number	Error Code	Verification
Byte	1	2	1	1	1	1	2
Content	0xFE	–	0x40	0xA3	0x88	0x00	–

#### ● Error codes

0x00–Firmware data receive successfully.

0x41–Firmware receive incompletely.

0x42–Verification failed.

Others–Refer to Section 2 for general error code descriptions.

### 4.4 YC1175 report upgrade result

YC1175 request:

Field	Frame Header	Length	Types of Commands	Command Code	Frame Number	Upgrade Result	Running Firmware Version	Verification
Byte	1	2	1	1	1	1	3	2
Content	0xFE	-	0x00	0xA4	0x88			-

### ● Upgrade Result

0x00 –Upgrade successful. Require the device to reboot after the upgrade and then report.

0x41–Firmware receive incompletely.

0x42–Verification failed.

0x43–Upgrade timeout. YC1175 upgrade time is 3min.

0x44–YC1175 firmware storage exception.

### ● Running Firmware Version

1. Three bytes indicate: major version + minor version + maintenance version respectively. For example, 0x010204 means V1.2.4.

2. Upload the upgraded version if the upgrade is successful, otherwise upload the version number of the currently running firmware.

RK1109 respond:

Field	Frame Header	Length	Types of Commands	Command Code	Frame Number	Error Code	Verification
Byte	1	2	1	1	1	1	2
Content	0xFE	-	0x40	0xA4	0x88	0x00	-