HX-SPI01-RFBK

SPI controller with RF remote control for digital LED strip

HX-SPI01-RFBK controller is suitable for controlling LED lamps driven by a variety of different types of chips. It is widely used in buildings, municipal lighting, stage scenery, entertainment venue decoration, etc.; it can realize horse racing, running water, trailing, color painting, scanning, raindrops Various running change effects; convenient wiring, simple to use; with memory storage function; with digital tube display, which can be controlled by the built-in buttons or with a RF remote control, the remote control has 4 areas of overall control or independent control functions; with multiple online synchronization functions.



Features

1. This product is a low-voltage SPI controller, the standard product supply voltage is 12-24V;
2. Four groups of SPI signal output ports (three-wire digital led strip) or two groups of SPI signal output ports (four-wire digital led strip), which can control up to 2048 pixels;
3. With digital tube and control buttons, it can also be used with RF remote control for mode selection, speed and IC point adjustment;
4. With power-off memory storage function;
5. Contains 136 effect modes, including horse racing, running water, trailing, color brushing, scanning, raindrops and other effects. The 135th mode is the 8-134th automatic cycle mode, and the 136th is the custom combination mode;
6. The controllers can realize multiple synchronous changes through shielded wire connection;
7. The remote control has 4 areas of overall control or independent control functions
8. This product is guaranteed for three years, excluding man-made damage, improper operation, overload short circuit or force majeure factors.

Technical Parameters:

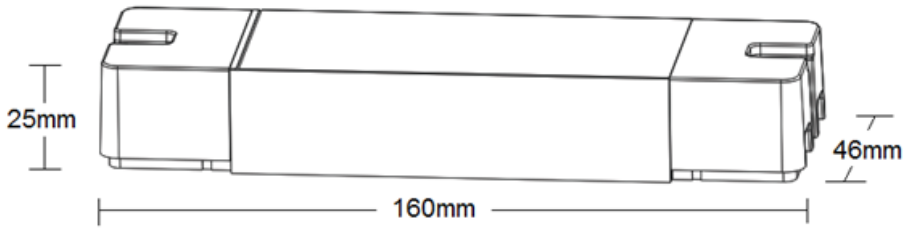
Controller:

Working temperature	-20-60℃	Working voltage	DC12-24V
Static consumption	<1W	RF frequency	2.4GHz
Gray level	256	Speed level	99
N. weight	100g	G. weight	130g
Dimension	L160*W46*H25 mm	Packing size	L170*W50*H29 mm
Output signal	4 groups SPI (3-wire LED digital strip) 2 groups SPI (4-wire LED digital strip)	Max. control points	2048
RF distance	≤20m	Modes	136
Memory function	Yes	Sync-work function	Yes
Compatible ICs	**UCS1903、WS2811、TM1804、SM16703、LPD6803**		

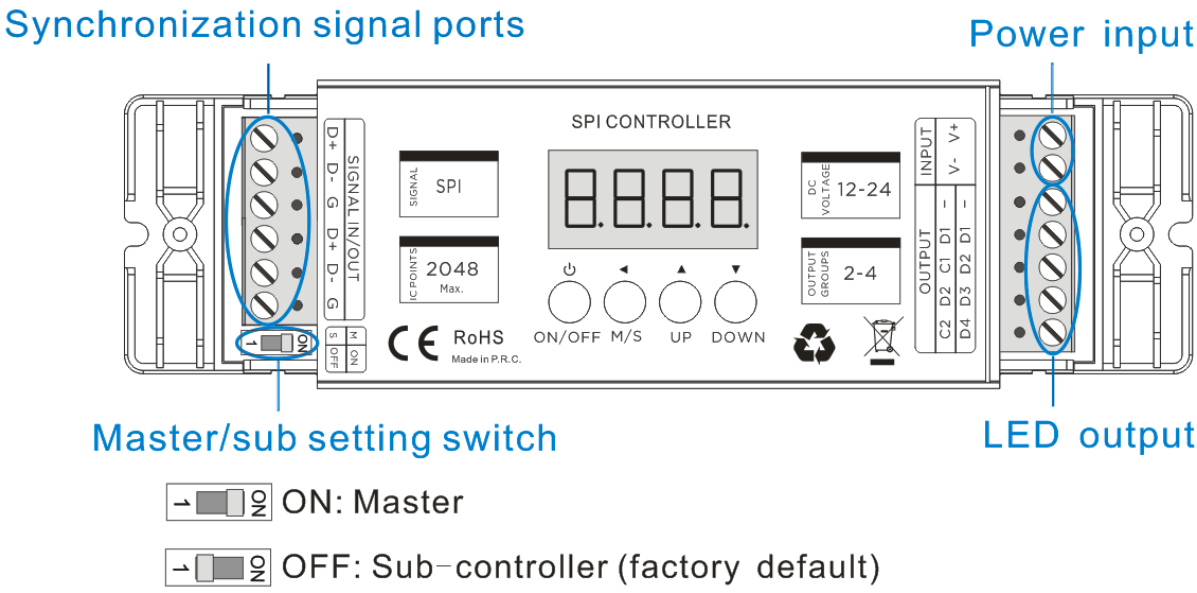
Remote control:

Working temperature	-20℃~60℃	Supply voltage	DC3V（AAA*2）
Standby current	<18uA	Working current	<25mA
Standby power	54uW	Working power	75mW
Net weight	95g	RF frequency	2.4GHz
External dimension	L150*W40*H20 mm	RF distance	≤20m

Dimension



Connection ports



Instructions for use

- Determine the controller is the master or the sub-controller, and set the DIP switch at the right position, master-ON, sub-controller- OFF;
- Connecting the load led strip at first, then connect the power input wires; and make sure that there is no short circuit between the connecting wires before powering on;
- The functions of the 4 buttons on the controller are as follows:

Button	Function description
ON/OFF	Turn on/off
M/S	Switch Mode/speed/brightness adjustment functions **Mode adjustment**: digital tube display H*** (*** is 000-136, 000 is displayed when controlled by the touch ring on the remote control) **Speed adjustment**: the digital tube displays S-** (*** is 01-99), the speed adjustment function is only valid for dynamic mode **Brightness adjustment**: the digital tube displays d*** (*** is 001-100), the brightness adjustment function is only valid for static mode
UP	Mode+/Speed+/Brightness+, adjust the object according to the setting result of M/S.
DOWN	Mode-/Speed-/Brightness-, adjust the object according to the setting result of M/S.

- **Parameter setting** includes control IC number setting and control IC type setting

In the off state (the controller needs to be powered on), long-press the "UP" and "DOWN" keys at the same time for two seconds, the digital tube displays **** (0010-2048, the current IC point number) and then enters the parameter setting interface , Press "M/S" to switch between two setting interfaces.

1) control IC number setting

Press "M/S" until the digital tube displays **** (**** is 0010-2048).

Press "UP"/ "DOWN" to increase/reduce the control IC number.

After the setting is completed, press the "ON/OFF" key to save and exit.

2) control IC type setting

Press "M/S" until the digital tube displays 1903/6803/2801.

Press "UP"/ "DOWN" to switch the control IC type.

1903 for UCS190, TM1804, SM16703 and other compatible ICs.

6803 for LPD6803.

2801 for WS2801.

After the setting is completed, press the "ON/OFF" key to save and exit.

● Custom combination mode settings

This mode is a free combination mode. Choosing 2-20 modes from the 1-134th mode and combine them into a cyclic mode, and each mode can set an independent change speed.

Step 1: In the off state, long-press the "M/S" and "Up" buttons at the same time for 2 seconds to enter Custom combination mode settings, the digital tube will light up and display "-**-", "-**-" represents the currently edited scene number. Please use the "UP" / "DOWN" keys to select the scene number to be edited. **For example, we will set a custom combination mode with 5 modes.**

Step 2: Setting the mode for -01-. Press "M/S" after Step 1 "-01-", the digital tube will display "H***". Please use the "UP" / "DOWN" keys to select the needed mode from 1-134th for "-01-". If the digital tube displays “H000”, mean there is no effect was set to current scene.

Step 3: Setting the speed for -01-. Press "M/S" after Step 2, the digital tube will display "S-**". Please use the "UP" / "DOWN" keys to select the needed speed from 01-99 for "-01-" mode. The status of loading led strips will be changed accordingly.

Press "M/S" after Step 3, the digital tube will display back to "-01-". Please press "UP" / "DOWN" keys to select the next edited scene number, and repeat the operation like step2 and step 3 to finished the all other 5 scenes from 2^{nd} to 6^{th}. And press the "ON/OFF" key to save and exit in the end.

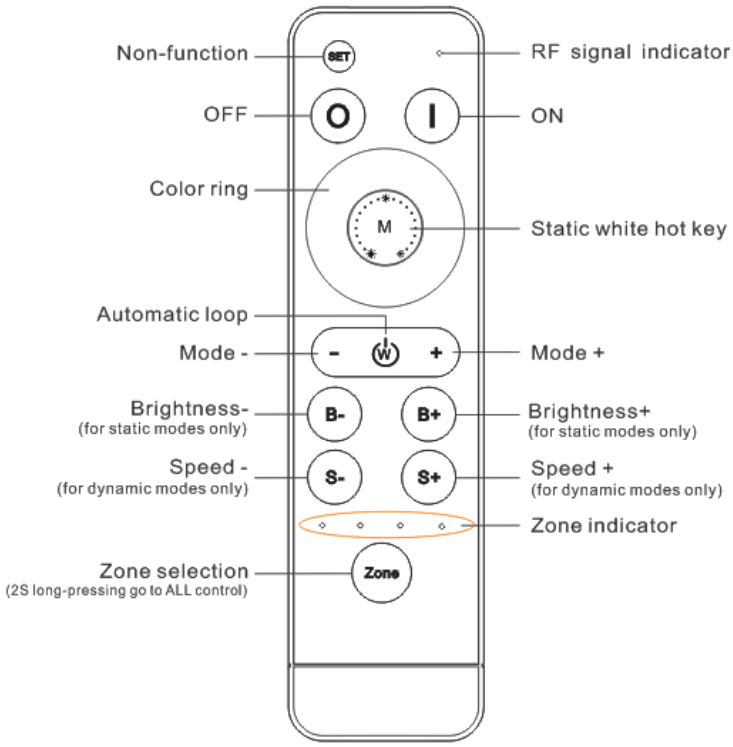
Important notes: When there are less than 20 scenes set, the scene should start from -01- the first number (because the 136th mode runs from scene “01”), and the scenes without effect need to be set to “H000”. Like example that we set 5 scenes to combinate the 136th mode, enter the edit menu and edit the respective modes and speeds of scenes "-01-" to "-05-" (can be not in order during the editing operation). After editing, please check the mode of scene "-06-" should be "H000", if not, please correct it by the "UP"/"DOWN" keys.

● Synchronization function

The synchronization control function can be formed by connecting up to 32 controllers, all controllers follow the first master control to achieve synchronous changes without delay.

After all the controllers are connected according to the wiring diagram (please make sure the position of the DIP switch of the master and the sub-controller is correct), just turn on the master, and the sub-controllers will change according to the speed and mode of the master. The green signal light on the sub-controller will flash in normal working statues.

Remote control： RFBK-RGB-2.4G



Button	Function description
SET	Non-function
I	ON
O	OFF
Color ring	Static color options, 64 colors in total, digital tube will display “H000”,brightness is adjustable by B+/B-.
M	Static white color hotkey, digital tube will display “H007”
⏻	Automatic loop hotkey, digital tube will display “H135”
−	Mode down (136 modes in total). Long-press can get fast adjusting.
+	Mode up (136 modes in total). Long-press can get fast adjusting.
B-	Brightness – for static colors by 100 levels. Long-press can get fast adjusting.
B+	Brightness + for static colors by 100 levels. Long-press can get fast adjusting.
S-	Speed down for dynamic mode (100 levels). Long-press can get fast adjusting.
S+	Speed up for dynamic mode (100 levels). Long-press can get fast adjusting.
Zone	Zone selection, 2 seconds long-press get “all-control”.

Mode table

No.	Mode description	No.	Mode description
1	Static Red	2	Static Green
3	Static Blue	4	Static Yellow
5	Static Purple	6	Static Cyan
7	Static White	8	3 color jumping
9	7 color jumping	10	7 color flashing
11	Red horse race-right	12	Blue horse race-right
13	Purple horse race-right	14	Orange horse race-right
15	White horse race-right	16	Cyan horse race-right
17	Cyan horse race-left	18	7 color horse race-right

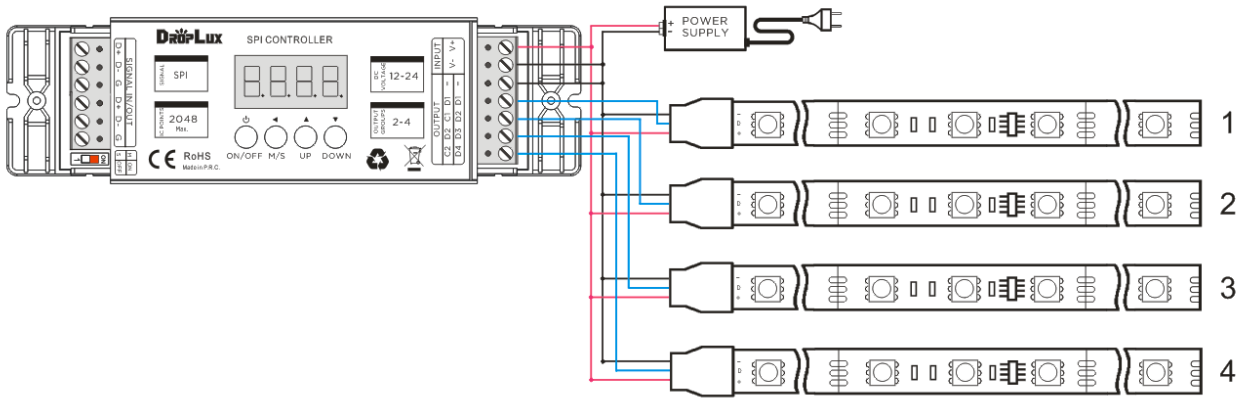
No.	Mode description	No.	Mode description
19	7 color horse race 2 direction	20	7 color jumping horse race right direction
21	White 1-pixel horse race-right I	22	Red 1-pixel horse race-right I
23	Green 1-pixel horse race-right I	24	Blue 1-pixel horse race-right I
25	White 1-pixel horse race-right II	26	Red 1-pixel horse race-right II
27	Green 1-pixel horse race-right II	28	Blue 1-pixel horse race-right II
29	White 3-pixel horse race-right	30	Red 3-pixel horse race-right
31	Green 3-pixel horse race-right	32	Blue 3-pixel horse race-right
33	White 5-pixel horse race-right	34	Red 5-pixel horse race-right
35	Green 5pixel horse race-right	36	Blue 5-pixel horse race-right
37	Red and white chasing(right)	38	Red, white, blue chasing(right)
39	Orange and purple chasing(right)	40	Orange and blank chasing(right)
41	Green and white chasing(right)	42	Blue and white chasing(right)
43	Red and yellow chasing(right)	44	Orange and blue chasing(right)
45	Red and blue chasing(right)	46	Blue, purple, yellow chasing(right)
47	Red and green chasing(right)	48	Blue and green chasing(right)
49	Pink and purple chasing(right)	50	Yellow and green chasing(right)
51	Red, yellow, green chasing(right)	52	Yellow chasing(right)
53	Cyan and white chasing(right)	54	Cyan and purple chasing(right)
55	Blue, purple, yellow floating	56	Red, green, white floating
57	Orange, yellow, red floating	58	Red, pink floating
59	Red, white floating	60	Blue, white floating
61	Green, white floating	62	All color floating
63	White random twinkle strobe	64	Red running water I
65	Green running water I	66	Blue running water I
67	Yellow running water I	68	Purple running water I
69	Cyan running water I	70	White running water I
71	Orange running water I	72	Cyan trailing right I
73	Cyan trailing right II	74	Cyan trailing left
75	Running back and forth with Cyan	76	Running back and forth with Purple
77	Red running water II	78	Green running water II
79	Blue running water II	80	Yellow running water II
81	Purple running water II	82	Cyan running water II
83	White running water II	84	7-color running water II
85	Cyan trails water to the right I	86	Cyan trails water to the right II
87	7-color trails water to the right	88	Red single trailing right
89	Purple single trailing right I	90	Blue single trailing right
91	Cyan single trailing right	92	White single trailing right
93	Green single trailing right	94	Yellow single trailing right
95	7-color jumping single trailing right	96	7-color queue single trailing right
97	7-color in turn single trailing right	98	Cyan double trailing left
99	Red double trailing right	100	Purple double trailing right
101	Blue double trailing right	102	Cyan double trailing right
103	White double trailing right	104	Green double trailing right
105	Yellow double trailing right	106	7-color jumping double trailing right
107	7-color queue double trailing right	108	7-color in turn double trailing right
109	7-color running water III	110	Blue double trailing on Red

No.	Mode description	No.	Mode description
111	Red double trailing on Blue	112	Green double trailing on Blue
113	Bule double trailing on Green	114	Red double trailing on Green
115	Green double trailing on Red	116	White double trailing on Blue
117	Double trailing on 7-color	118	7-color opening brushing
119	7-color closing brushing	120	7-color open-closing
121	7-color closing	122	Red closing
123	Green closing	124	Blue closing
125	Yellow closing	126	Purple closing
127	Cyan closing	128	White closing
129	7-color stacking right	130	7-color stacking
131	6-color opening stacking	132	6- color closing stacking
133	7-color moving	134	7-color brushing
135	Auto loop playback (8-134)	136	User-defined combination mode

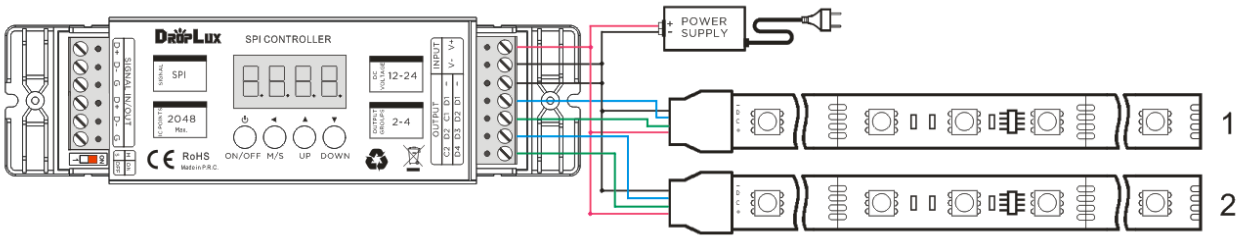
Connection diagram

Stand-alone Circuit1:

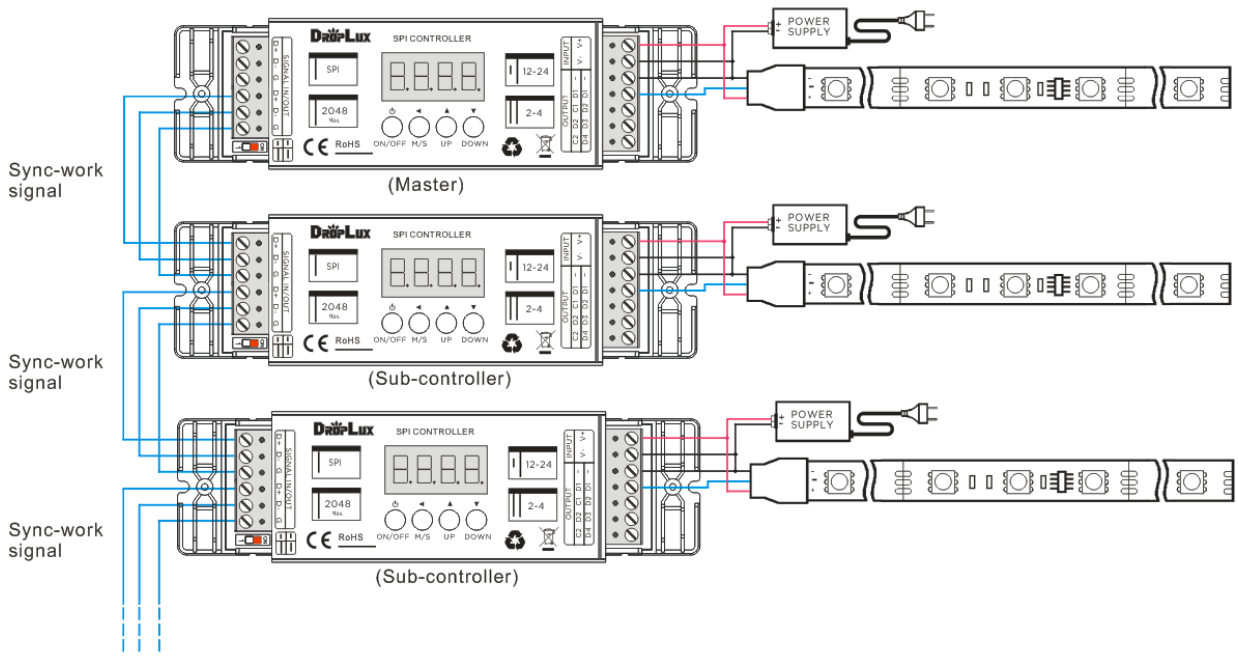
1) Diagram with single-signal-wire digital led strip (such as: UCS1903)



2) Diagram with double-signal-wire digital led strip (such as: LPD6803)



Synchronization Circuit 2: take the 3-wire digital led strip as an example



Note: The first one will be the master, please set the DIP switch to ON position; others from the second one will be the sub-control, please keep the DIP switch in the factory default setting -OFF.

About RF code.

The biggest advantage of this system is that it can not only solve the cabling problem in engineering wirelessly, but also realize a wired-like operation experience. In order to facilitate the early testing and debugging of the project, the factory status of the receiver is normally unpaired and each remote controller has a unique code value. The user should perform the matching work of the remote controller and the receiver during the installation of the project to avoid the mutual influence of the radio frequency remote control technology during the later use.

Please pay attention to the following 3 points before operation:

1) All equipment in the complete system after installation should have a unified and unique code value, so as to achieve the security and stability of the system.

2) The receiver can only store one code value and cannot be overwritten. Before learning the new code value, it is necessary to clear the original code of the receiver; the remote controller can only save one code value but can be overwritten and can also restore the factory settings. In order to facilitate the later maintenance, the three components that may be involved in the system (including receivers, handheld remote controllers, and panel remote controllers) can realize mutual learning of code values.

3) Since the receiver performs code value learning in the power-on state, batch-operation is available **(power-one the all receivers which will be in same zone, and operate the matching/clearing the RF code all of them at the same time)**. And in order to avoid confusion in the area, it is recommended that each area has an independent power switch so that the power of other areas can be easily cut off when the code is being operated.

(1)Code pairing operation: means that the receiver will only be controlled by the value code remote controller.

Step	Operation	Instructions
1	Connecting the load to the receiver and power on it.	1.It is necessary to clear the code first, if the receiver was coded before. 2.Batch operation can be performed within the

		remote control range.
2	Select area	Select the area with the "Zone" key and the corresponding indicator lights up
3	Press and hold “ON” on the remote control for 5 seconds, the indicator of the remote control will flash quickly, means it enters the pairing code transmission status.	Will automatically exit code transmission status after 60 seconds, or pressing any key to exit.
4	See the load light flashes 3 times and return to the initial state	Pairing coding is finished successfully

(2)Code clearing operation: means that the original code value of the receiver will be cleared and returned to the factory state. Then it can be controlled by any compatible remote controller and can learn to a new code.

Step	Operation	Instructions
1	Connecting the load to the receiver and power on it.	**1. The clearing operation should be finished within 1 minute after the receiver is powered on.** If exceeds the time, can be powered on again. 2. Batch operation can be performed within the remote control range.
2	Press and hold the remote control “Off” for 5 seconds. The indicator of the remote control flashes quickly, means it enters the clearing code transmission status. There is no need to select the corresponding area when clearing code.	1. Will automatically exit code transmission status after 60 seconds or pressing any key to exit. 2. If the original remote controller is lost, the new remote controller can be used for clearing operations.
3	See the load light flashes 3 times and return to the initial state	Clearing coding is finished successfully

(3)Code learning operation between remote controls: Used to unify system code values or copy a new remote controls.

Since each remote controller has its own unique code at the time of delivery, when there are multiple remote controllers in one system, one of them (for example, remote controller A) must be selected as the system code value, and the code value of the rest remote controllers (for example, remote controller B) should be copied to the same one.

Step	Operation	Instructions
1	A remote control：Press and hold “ON” on the remote control for 5 seconds, the indicator of the remote control will flash quickly, means it enters the pairing code transmission status.	Will automatically exit code transmission status after 60 seconds, or pressing any key to exit.
2	B remote control: long press "mode key" for 5 seconds, the remote indicator light changes from 100% light to off, means entering the code value receiving state	Will automatically exit the code value receiving state after 30 seconds, or exit after learning the code value successfully.
3	see the B remote control indicator light flash 3 times	Code copying is finished and exit code value receiving status.

(4) Copying code from receiver to remote control.

A new remote control can also copy code from any one of the receivers in the whole system, after the successful operation, the new remote control can replace the original remote (if it is lost).

Step	Operation	Instructions
1	Cut off the power of receiver.	Which one will be controlled by remote.

2	Long-press "mode key" for 5 seconds, the remote indicator light changes from 100% light to off, means entering the code value receiving state.	Will automatically exit the code value receiving state after 30 seconds, or exit after learning the code value successfully.
3	Power on the receiver, will see remote control indicator light flash 3 times.	Code copying is finished and exit code value receiving status.

* For security of the system, the distance from remote control to the one receiver should be less than 2 meters in this operation.

* Only one time operation is requested for the whole system, no need different operation for different zones.

(5)The remote controller restores the factory setting: it means that the remote controller will be restored to the factory's unique code value.

Step	Operation	Instructions
1	Long press "mode " for 20 seconds	The remote indicator light dim down continuously until the 20th second and then back to 100% light. Means this step is finished.
2	Press the "OFF" to confirm, the remote indicator light flashes 3 times	Restore factory settings successfully.

Product information for placing order

Product name	Item number
LED digital Controller with remote control	HX-SPI01-RFBK