橙家智能科技有限公司

**[Home Smart Box Network Protocol]**

Revision: v00.00.01

Release Date: 2016-03-15

Document Revision

|  |  |  |  |
| --- | --- | --- | --- |
| **Revision** | **Date** | **Author** | **Description** |
| 00.00.01 | 2016-03-15 |  | Initial created. |
|  |  |  |  |

Table of Contents

[**1** **Scope** 5](#_Toc448254925)

[**2** **Requirements** 6](#_Toc448254926)

[**3** **Reference** 7](#_Toc448254929)

[**4** **Conventions** 8](#_Toc448254930)

[**5** **Scenario** 9](#_Toc448254931)

[**5.1** **Box Discover Stage** 9](#_Toc448254932)

[**5.2** **Normal Stage** 9](#_Toc448254933)

[**6** **Protocol** 11](#_Toc448254934)

[**6.1** **Box Discover (0x8801)** 11](#_Toc448254935)

[**6.2** **Box Discover Response (0x8802)** 11](#_Toc448254936)

[**6.3** **Get Devices (0x8811)** 11](#_Toc448254937)

[**6.4** **Get Devices Response (0x8812)** 12](#_Toc448254938)

[**6.5** **Get Device Info (0x8813)** 12](#_Toc448254939)

[**6.6** **Get Device Info Response (0x8814)** 12](#_Toc448254940)

[**6.7** **Get Device Status (0x8821)** 13](#_Toc448254941)

[**6.8** **Get Device Status Response (0x8822)** 13](#_Toc448254942)

[**6.9** **Set Device Status (0x8823)** 13](#_Toc448254943)

[**6.10** **Get Device Timer (0x8831)** 14](#_Toc448254944)

[**6.11** **Get Device Timer Response (0x8832)** 14](#_Toc448254945)

[**6.12** **Set Device Timer (0x8833)** 15](#_Toc448254946)

[**6.13** **Delete Device Timer (0x8834)** 15](#_Toc448254947)

[**6.14** **Get Device Delay (0x8841)** 16](#_Toc448254948)

[**6.15** **Get Device Delay Response (0x8842)** 16](#_Toc448254949)

[**6.16** **Set Device Delay (0x8843)** 17](#_Toc448254950)

[**6.17** **Delete Device Delay (0x8844)** 18](#_Toc448254951)

[**6.18** **Get Device Linkage (0x8851)** 18](#_Toc448254952)

[**6.19** **Get Device Linkage Response (0x8852)** 18](#_Toc448254953)

[**6.20** **Set Device Linkage (0x8853)** 19](#_Toc448254954)

[**6.21** **Delete Device Linkage (0x8854)** 20](#_Toc448254955)

[**6.22** **Probe Device (0x8861)** 20](#_Toc448254956)

[**6.23** **Device Event (0x8871)** 20](#_Toc448254957)

[**6.24** **Device Action (0x8881)** 21](#_Toc448254958)

[**6.25** **Result (0x88A1)** 21](#_Toc448254959)

[**7** **Definition** 22](#_Toc448254960)

[**7.1** **Device Info** 22](#_Toc448254961)

[**7.1.1** **Device ID** 22](#_Toc448254962)

[**7.1.2** **Device Class** 22](#_Toc448254963)

[**7.1.3** **Device Interface** 22](#_Toc448254964)

[**7.2** **Device Status** 23](#_Toc448254965)

[**7.2.1** **Work Mode** 23](#_Toc448254966)

[**7.3** **Device Event** 23](#_Toc448254967)

[**7.4** **Device Action** 24](#_Toc448254968)

[**7.5** **Error Code** 24](#_Toc448254969)

1. **Scope**

本文档用于描述HSB和PAD之间的通信方式和协议

* HSB (Home Smart Box)：家庭智能盒子，是智能家居的核心，下文简称BOX
* PAD：客户端，用于设置智能家居的各种功能

1. **Requirements**

4. **Reference**
5. **Conventions**

本文档中协议格式有一些相同的约定，如下描述，

|  |  |  |
| --- | --- | --- |
| CMD | | LEN |
| Ver Minor | Ver Major | RESERVED |

Packet头部由16 Bit的CMD和16 Bit的LEN组成，整个Packet按4 Byte对齐，不足部分补0

CMD – Packet的类型

LEN – Packet的长度

RESERVED – 为了扩展预留的字段，或者仅仅是为了对齐

1. **Scenario**
   1. **Box Discover Stage**

PAD端App启动之后，开始发送UDP广播包Box Discover到端口18000；BOX收到之后回复Box Discover Response，这样PAD App可以得到BOX的IP地址，随后进入Normal Stage。

Box Discover

Box Discover Response

BOX

PAD

* 1. **Normal Stage**

PAD向BOX的18002端口发起TCP/IP连接，之后的通信都在此TCP/IP连接内进行。

通信有二种方式，

1. PAD向BOX发送消息，BOX回应消息，大部分消息遵循此方式
2. BOX主动发送消息给PAD，目前仅有”Device Event”是此类型

Tcp connect

Get Device Info Resp

BOX

PAD

Get Device Info

Device Event

Tcp disconnect

……

1. **Protocol**
   1. **Box Discover (0x8801)**

Purpose: PAD寻找局域网内的BOX

Reply: Box Discover Response

Direction: PAD to BOX

Packet Type: UDP

DIP: 局域网广播地址

(例如，PAD IP：192.168.1.100，Netmask: 255.255.255.0则广播地址为192.168.1.255)

DPORT: 18001

SIP: ANY

SPORT: ANY

32

16

0

|  |  |  |
| --- | --- | --- |
| CMD (0x8801) | | LEN |
| Ver Minor | Ver Major | UID |

* 1. **Box Discover Response (0x8802)**

Purpose: BOX回应来自PAD的Box Discover

Reply: None

Direction: BOX to PAD

Packet Type: UDP

DIP: “Box Discover” Packet的SIP

DPORT: “Box Discover” Packet的SPORT

SIP: ANY

SPORT: ANY

|  |  |  |
| --- | --- | --- |
| CMD (0x8802) | | LEN |
| Ver Minor | Ver Major | BID |

* 1. **Get Devices (0x8811)**

Purpose: 获得BOX上管理的所有Device ID

Reply: Get Devices Response

Direction: PAD to BOX

Packet Type: TCP

|  |  |
| --- | --- |
| CMD (0x8811) | LEN |

* 1. **Get Devices Response (0x8812)**

Purpose: BOX回应来自PAD的Get Devices消息

Reply: None

Direction: BOX to PAD

Packet Type: TCP

|  |  |
| --- | --- |
| CMD (0x8812) | LEN |
| Device ID 1 | |
| …… | |
| Device ID N | |

* 1. **Get Device Info (0x8813)**

Purpose: PAD获取BOX上指定Device的信息

Reply: Get Device Info Response

Direction: PAD to HSB

Packet Type: TCP

|  |  |
| --- | --- |
| CMD (0x8813) | LEN |
| Device ID | |

* 1. **Get Device Info Response (0x8814)**

Purpose: BOX回应来自PAD的Get Device Info消息

Reply: None

Direction: BOX to PAD

Packet Type: TCP

|  |  |
| --- | --- |
| CMD (0x8814) | LEN |
| Device ID | |
| Driver ID | |
| CLASS | INTERFACE |
| MAC[4] | |
| MAC[2] | RESERVED |

* 1. **Get Device Status (0x8821)**

Purpose: PAD获取BOX上指定Device的状态

Reply: Get Device Status Response

Direction: PAD to BOX

Packet Type: TCP

|  |  |
| --- | --- |
| CMD (0x8821) | LEN |
| Device ID | |

* 1. **Get Device Status Response (0x8822)**

Purpose: BOX回应来自PAD的Get Device Status消息

Reply: None

Direction: BOX to PAD

Packet Type: TCP

|  |  |
| --- | --- |
| CMD (0x8822) | LEN |
| Device ID | |
| Status ID 1 | Status Value 1 |
| …… | |
| Status ID N | Status Value N |

* 1. **Set Device Status (0x8823)**

Purpose: PAD设置BOX上指定Device的状态

Reply: Result

Direction: PAD to BOX

Packet Type: TCP

|  |  |
| --- | --- |
| CMD (0x8823) | LEN |
| Device ID | |
| Status ID 1 | Status Value 1 |
| …… | |
| Status ID N | Status Value N |

* 1. **Get Device Timer (0x8831)**

Purpose: PAD获取BOX上指定Device的定时设置信息

Reply: Get Device Timer Response

Direction: PAD to BOX

Packet Type: TCP

|  |  |
| --- | --- |
| CMD (0x8831) | LEN |
| Device ID | |
| Timer ID | RESERVED |

* 1. **Get Device Timer Response (0x8832)**

Purpose: BOX回应来自PAD的Get Device Timer消息

Reply: None

Direction: BOX to PAD

Packet Type: TCP

|  |  |  |  |
| --- | --- | --- | --- |
| CMD (0x8832) | | LEN | |
| Device ID | | | |
| Timer ID | | Work Mode | Flag |
| Hour | Minute | Second | Weekday |
| Act ID | | Act Param1 | |
| Act Param2 | | | |

Device ID – 定时器所在的Device

Timer ID – Device的定时器编号 (0 - 31)

Work Mode – BIT0-BIT2代表工作模式

Flag – BIT0代表定时器动作的类型：0代表Set Status动作，1代表Action动作

Hour – 定时器的小时部分 (0 - 23)

Minute – 定时器的分钟部分 (0 - 59)

Second – 定时器的秒钟部分 (0 - 59)

Weekday - Bit0 to Bit6分别代表周一到周日七天；Bit7代表One Shot，即触发一次就自动删除

Act ID – 定时器到时后会执行的动作，参考Definition章节的Status和Action部分

Act Param1 – 动作的第一个参数

Act Param2 – 动作的第二个参数

* 1. **Set Device Timer (0x8833)**

Purpose: PAD设置BOX上指定Device的定时信息

Reply: Result

Direction: PAD to BOX

Packet Type: TCP

|  |  |  |  |
| --- | --- | --- | --- |
| CMD (0x8833) | | LEN | |
| Device ID | | | |
| Timer ID | | Work Mode | Flag |
| Hour | Minute | Second | Weekday |
| Act ID | | Act Param1 | |
| Act Param2 | | | |

字段定义参考Get Device Timer

* 1. **Delete Device Timer (0x8834)**

Purpose: PAD删除BOX上指定Device的定时设置信息

Reply: Result

Direction: PAD to BOX

Packet Type: TCP

|  |  |
| --- | --- |
| CMD (0x8834) | LEN |
| Device ID | |
| Timer ID | RESERVED |

* 1. **Get Device Delay (0x8841)**

Purpose: PAD获取BOX上指定Device的延时设置信息

Reply: Get Device Delay Response

Direction: PAD to BOX

Packet Type: TCP

|  |  |
| --- | --- |
| CMD (0x8841) | LEN |
| Device ID | |
| Delay ID | RESERVED |

* 1. **Get Device Delay Response (0x8842)**

Purpose: BOX回应来自PAD的Get Device Delay消息

Reply: None

Direction: BOX to PAD

Packet Type: TCP

|  |  |  |
| --- | --- | --- |
| CMD (0x8842) | LEN | |
| Device ID | | |
| Delay ID | Work Mode | Flag |
| Event ID | Event Param1 | |
| Event Param2 | | |
| Act ID | Act Param1 | |
| Act Param2 | | |
| Delay Secs | | |

Device ID – 延时器所在的Device

Delay ID – Device的延时器编号 (0 - 7)

Work Mode – 代表延时器会发生作用的所有工作模式组合

Flag – BIT0代表定时器动作的类型：0代表Set Status动作，1代表Action动作

Event ID – 启动延时器的事件编号

Evt Param1 –启动延时器的事件的第一个参数

Evt Param2 –启动延时器的事件的第二个参数

Act ID –延时器到时后会执行的动作，参考Definition章节的Status和Action部分

Act Param1 – 动作的第一个参数

Act Param2 – 动作的第二个参数

Delay Secs – 延时的秒数

* 1. **Set Device Delay (0x8843)**

Purpose: PAD设置BOX上指定Device的延时信息

Reply: Result

Direction: PAD to BOX

Packet Type: TCP

|  |  |  |
| --- | --- | --- |
| CMD (0x8843) | LEN | |
| Device ID | | |
| Delay ID | Work Mode | Flag |
| Event ID | Event Param1 | |
| Event Param2 | | |
| Act ID | Act Param1 | |
| Act Param2 | | |
| Delay Seconds | | |

字段定义参考Get Device Delay

* 1. **Delete Device Delay (0x8844)**

Purpose: PAD删除BOX上指定Device的延时设置信息

Reply: Result

Direction: PAD to BOX

Packet Type: TCP

|  |  |
| --- | --- |
| CMD (0x8844) | LEN |
| Device ID | |
| Delay ID | RESERVED |

* 1. **Get Device Linkage (0x8851)**

Purpose: PAD获取BOX上指定Device的联动设置信息

Reply: Get Device Linkage Response

Direction: PAD to BOX

Packet Type: TCP

|  |  |
| --- | --- |
| CMD (0x8851) | LEN |
| Device ID | |
| Linkage ID | RESERVED |

* 1. **Get Device Linkage Response (0x8852)**

Purpose: BOX回应来自PAD的Get Device Linkage消息

Reply: None

Direction: BOX to PAD

Packet Type: TCP

|  |  |  |
| --- | --- | --- |
| CMD (0x8852) | LEN | |
| Device ID | | |
| Linkage ID | Work Mode | Flag |
| Event ID | Event Param1 | |
| Event Param2 | | |
| Act Device ID | | |
| Act ID | Act Param1 | |
| Act Param2 | | |

Device ID – 联动器所在的Device ID

Delay ID – Device的联动器编号 (0 - 7)

Work Mode – 代表联动器会发生作用的所有工作模式组合

Flag – BIT0代表定时器动作的类型：0代表Set Status动作，1代表Action动作

Event ID – 启动联动器的事件编号

Evt Param1 –启动联动器的事件的第一个参数

Evt Param2 –启动联动器的事件的第二个参数

Act Device ID – 需要联动的Device ID

Act ID –联动器到时后会执行的动作，参考Definition章节的Status和Action部分

Act Param1 – 动作的第一个参数

Act Param2 – 动作的第二个参数

* 1. **Set Device Linkage (0x8853)**

Purpose: PAD设置BOX上指定Device的联动信息

Reply: Result

Direction: PAD to BOX

Packet Type: TCP

|  |  |  |
| --- | --- | --- |
| CMD (0x8853) | LEN | |
| Device ID | | |
| Linkage ID | Work Mode | Flag |
| Event ID | Event Param1 | |
| Event Param2 | | |
| Act Device ID | | |
| Act ID | Act Param1 | |
| Act Param2 | | |

字段定义参考Get Device Linkage

* 1. **Delete Device Linkage (0x8854)**

Purpose: PAD删除BOX上指定Device的联动设置信息

Reply: Result

Direction: PAD to BOX

Packet Type: TCP

|  |  |
| --- | --- |
| CMD (0x8854) | LEN |
| Device ID | |
| Linkage ID | RESERVED |

* 1. **Probe Device (0x8861)**

Purpose: PAD通知BOX去探测指定Driver类型的设备

Reply: Result

Direction: PAD to BOX

Packet Type: TCP

|  |  |
| --- | --- |
| CMD (0x8861) | LEN |
| Driver ID | |

* 1. **Device Event (0x8871)**

Purpose: BOX通知PAD关于Device状态的改变

Reply: None

Direction: BOX to PAD

Packet Type: TCP

|  |  |
| --- | --- |
| CMD (0x8871) | LEN |
| Device ID | |
| Event ID | Event Param1 |
| Event Param2 | |

Event定义请参考Definition相关章节

* 1. **Device Action (0x8881)**

Purpose: PAD控制指定的Device执行动作

Reply: Result

Direction: PAD to BOX

Packet Type: TCP

|  |  |
| --- | --- |
| CMD (0x8881) | LEN |
| Device ID | |
| Act ID | Act Param1 |
| Act Param2 | |

Event定义请参考Definition相关章节

* 1. **Result (0x88A1)**

Purpose: BOX回应来自PAD的消息，告知执行结果

Reply: None

Direction: BOX to PAD

Packet Type: TCP

|  |  |
| --- | --- |
| CMD (0x88A1) | LEN |
| Error Code | RESERVED |

1. **Definition**
   1. **Device Info**
      1. **Device ID**

Device ID是uint32\_t类型的值，其中0代表HSB本身，其他值代表Device

Device ID由HSB负责分配和维护

* + 1. **Device Class**

|  |  |  |
| --- | --- | --- |
| ID | Device Class | Description |
| 0 | HSB\_DEV\_CLASS\_SOCKET | 插座 |
| 1 | HSB\_DEV\_CLASS\_SWITCH | 开关 |
| 2 | HSB\_DEV\_CLASS\_LAMP | 灯 |
| 3 | HSB\_DEV\_CLASS\_SENSOR | 传感器 |
| 4 | HSB\_DEV\_CLASS\_REMOTE\_CONTROL | 遥控器 |
| 5 | HSB\_DEV\_CLASS\_CAMERA | 摄像头 |
| 6 | HSB\_DEV\_CLASS\_SOUND\_BOX | 音箱 |
| 7 | HSB\_DEV\_CLASS\_DOORBELL | 门铃 |
| 8 | HSB\_DEV\_CLASS\_ENTRANCE\_GURAD | 门禁 |
| 9 | HSB\_DEV\_CLASS\_TV | 电视 |
| 10 | HSB\_DEV\_CLASS\_AIR\_CONDITIONING | 空调 |
| 11 | HSB\_DEV\_CLASS\_CURTAIN | 窗帘 |
| 12 | HSB\_DEV\_CLASS\_FRIDGE | 冰箱 |
| 13 | HSB\_DEV\_CLASS\_AIR\_CLEANER | 空气净化器 |
| 14 | HSB\_DEV\_CLASS\_WATER\_HEATER | 热水器 |
| 15 | HSB\_DEV\_CLASS\_OVEN | 烤箱 |
| 16 | HSB\_DEV\_CLASS\_MICROWAVE\_OVEN | 微波炉 |
| 17 | HSB\_DEV\_CLASS\_LAMPBLACK | 油烟机 |
| 18 | HSB\_DEV\_CLASS\_FAN | 风扇 |
| 19 | HSB\_DEV\_CLASS\_WARMING\_OVEN | 暖炉 |
| 20 | HSB\_DEV\_CLASS\_HEATING | 暖气 |
| 21 | HSB\_DEV\_CLASS\_STB | 机顶盒 |
| 22 | HSB\_DEV\_CLASS\_BRACELET | 手环 |
| 23 | HSB\_DEV\_CLASS\_CUP | 杯子 |
| 24 | HSB\_DEV\_CLASS\_ROUTER | 路由器 |
| 25 | HSB\_DEV\_CLASS\_WASHER | 洗衣机 |
| 26 | HSB\_DEV\_CLASS\_ELECTRIC\_COOKER | 电饭煲 |
| 27 | HSB\_DEV\_CLASS\_FAX | 传真机 |
| 28 | HSB\_DEV\_CLASS\_PRINTER | 打印机 |

Table Device Class Definition

* + 1. **Device Interface**

|  |  |  |
| --- | --- | --- |
| ID | Device Interface | Description |
| 0 | HSB\_INTERFACE\_WIFI | WIFI |
| 1 | HSB\_INTERFACE\_ZIGBEE | Zigbee |
| 2 | HSB\_INTERFACE\_BLUETOOTH | Blutooth |
| 3 | HSB\_INTERFACE\_IR | 红外 |
| 4 | HSB\_INTERFACE\_NFC | NFC |
| 5 | HSB\_INTERFACE\_AM | AM |
| 6 | HSB\_INTERFACE\_FSK | FSK |

Table Device Interface Definition

* 1. **Device Status**

本协议规定：凡是可以设置、并且可以被获得的变量称为“可控状态(Status)”

凡是只能被获得，但是不能被设置的变量称为“只读状态(RO Status)”

例如，On/Off状态、灯光亮度等，可以被读取和设置的，属于可控状态；

门窗传感器的开合，可以被读取但不能被设置，属于只读状态

目前支持的所有状态如下表所示，

|  |  |  |
| --- | --- | --- |
| **ID** | **Status** | **Value** |
| 0 | HSB\_STATUS\_ON\_OFF | 0: OFF  1: ON |
| 1 | HSB\_STATUS\_BRIGHTNESS | Brightness (1-100) |
| 2 | HSB\_STATUS\_COLOR | Color (1-65535) |
| 3 | HSB\_STATUS\_REC\_ON\_OFF | 0: Record OFF  1: Record ON |
| 4 | HSB\_STATUS\_WORK\_MODE | Work Mode |

Table Device Status Definition

* + 1. **Work Mode**

|  |  |  |
| --- | --- | --- |
| ID | Work Mode | Description |
| 0 | HSB\_WORK\_MODE\_HOME | 在家模式 |
| 1 | HSB\_WORK\_MODE\_OUTSIDE | 外出模式 |
| 2 | HSB\_WORK\_MODE\_GUARD | 警戒模式 |

Table Work Mode Definition

* 1. **Device Event**

本协议规定：Device主动通知BOX的事件，定义为Device Event

Event定义如下，

|  |  |  |  |
| --- | --- | --- | --- |
| **ID** | **Event ID** | **Param1** | **Param2** |
| 0 | HSB\_EVT\_STATUS\_UPDATED | Status ID | Status Value |
| 1 | HSB\_EVT\_DEV\_UPDATED | 1: Add  0: Offline | 0 |
| 2 | HSB\_EVT\_SENSOR\_TRIGGERED | Sensor Type | 0 |
| 3 | HSB\_EVT\_SENSOR\_RECOVERED | Sensor Type | 0 |
| 4 | HSB\_EVT\_MODE\_CHANGED | Work Mode | 0 |

Table Device Event Definition

* 1. **Device Action**

本协议规定：HSB对Device的指令，定义为Device Action

不同于Set Status，Device Action仅仅指不会影响Status的动作，例如，

打开开关，会影响到ON\_OFF Status，属于Set Status

发出警报，没有对应的Status，属于Device Action

|  |  |  |  |
| --- | --- | --- | --- |
| **ID** | **Action ID** | **Param1** | **Param2** |
| 0 | HSB\_ACT\_ALARM | 0 | 0 |
| 1 | HSB\_ACT\_REMOTE\_CONTROL | Type | Key |

Table Device Action Definition

* 1. **Error Code**

|  |  |  |
| --- | --- | --- |
| ID | Error Code | Description |
| 0 | HSB\_E\_OK | OK |
| 1 | HSB\_E\_INVALID\_MSG | 非法消息 |
| 2 | HSB\_E\_NOT\_SUPPORT | 不支持 |
| 3 | HSB\_E\_BAD\_PARAM | 参数错误 |
| 4 | HSB\_E\_NO\_MEMORY | 内存不够 |
| 5 | HSB\_E\_OTHERS | 其他错误 |
| 6 | HSB\_E\_UNDEFINED\_6 | 未定义6 |
| 7 | HSB\_E\_UNDEFINED\_7 | 未定义7 |
| 8 | HSB\_E\_UNDEFINED\_8 | 未定义8 |
| 9 | HSB\_E\_UNDEFINED\_9 | 未定义9 |
| 10 | HSB\_E\_UNDEFINED\_10 | 未定义10 |
| 11 | HSB\_E\_UNDEFINED\_11 | 未定义11 |
| 12 | HSB\_E\_UNDEFINED\_12 | 未定义12 |
| 13 | HSB\_E\_UNDEFINED\_13 | 未定义13 |
| 14 | HSB\_E\_UNDEFINED\_14 | 未定义14 |
| 15 | HSB\_E\_UNDEFINED\_15 | 未定义15 |

Table Error Code Definition