SHANGHAI ONBON TECHNOLOGY INC.

iledcloud communicate protocol with asynchronous full color controller

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Version history:

版本号	日期	作者	Description
1.0	2018-5-18	黄明涛	从 Markdown 整理的初始版本
	2018-5-23	黄明涛	修改登录指令，增加拒绝动作 增加 Encryption Algorithm 增加‘uploadFileToFtpServer’指令 修改‘findFile‘指令，增加返回‘mtime‘
	2018-5-28	原野	修改检查字库指令，支持多项查询
	2018-5-29	原野	修改‘findFile’ 指令，回复文件不存在时’mtime’为 Empty
	2018-6-5	原野	修改‘reboot’指令，回复增加异步命令等待时间
	2018-6-6	原野	删除‘cleanAllProgram’指令，增加‘clearAllProgram’命令
	2018-6-7	原野	修改‘开始播放’ 指令 修改‘停止播放’ 指令 修改‘节目播放流程’ 指令
	2018-6-8	原野	修改登录指令，回复中增加‘save’参数
	2018-6-12	原野	修改‘校对时间’指令，增加参数‘timezone’ 修改‘设置自动授时’指令，修改参数 Define
	2018-6-14	原野	修改‘校对时间’指令，删除参数‘timezone’，增加参数‘isutc’ 增加‘设置折屏’指令
	2018-6-20	原野	修改属性列表 增加标准时区汇总
	2018-6-25	原野	修改‘开始播放’指令，增加‘dynamic’和‘all’类型 修改‘停止播放’指令，增加‘dynamic’和‘all’类型
	2018-6-27	原野	修改‘获取控制卡状态’指令，增加‘gps’相关参数
	2018-7-4	原野	增加控制器诊断相关命令
	2018-7-6	原野	修改‘即时调亮’指令，增加‘changemode’参数 增加‘恢复出厂固件’指令
	2018-7-10	黄明涛	整理传感器管理类指令 整理’自动调亮’指令
	2018-7-17	黄明涛	整理动态区管理类指令 更新属性列表
	2018-8-16	黄明涛	修改折屏指令，去掉 width,height 两参数 修改绑定继电器指令
	2018-8-27	黄明涛	修正开关屏继电器设置指令参数 Description 根据增强型播放列表修改 Update play dynamic area 指令 Description
	2018-9-12	黄明涛	增加‘插播节目列表’ 指令和‘停止插播节目列表’ 指令 引入插播，而修改‘查询播放状态’指令的回复
	2019-1-22	黄明涛	增加 GPS 速度控制行为指令，勘误
	2019-3-14	黄明涛	增加提示信息语言设置指令，并增加相应的属性、Error 以及已支持的语言列表
	2019-4-17	黄明涛	新增复合传感器各子 Sensor address 及功能序号

			新增数据库查询指令
	2019-6-11	黄明涛	新增直接控制继电器指令
	2019-8-7	原野	增加切换播放模式指令 修改截屏命令，删除 delaytime 参数
	2019-11-12	黄明涛	修改“setLogo”指令 增加“addVoice” 指令，用于语音合成 更新 Appendix1、3
	2019-12-15	黄明涛	增加 IO 节目选择所需的新属性”gpiomode”和新指令“IO 模式切换”-“updateGpioMode”
	2020-08-28	黄明涛	扩展 BX-Y 系列型号汇总表，新增型号 增加“Add TLS certification”指令 增加“删除 TLS 证书”指令 增加“File authentication switch”指令 增加“播放音频命令” 修改“移动文件(夹)”指令，增加素材认证相关参数 增加 Sensor address 段和 Sensor function number 修改“Update play dynamic area” 指令，增加“Update dynamic area material”指令，增加更新本地素材功能和文件认证功能 增加动态区“倒计时开关”指令 动态区 URLText 类型增加网络数据类型拓展，添加动态区转义说明 增加“查询接收卡”指令 增加“设置串口”指令，新增属性 serialproperty

catalog

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1. Protocol description

"Asynchronous full-color second-generation cloud mode communication protocol" (hereinafter referred to as "second-generation cloud protocol") is a guiding document for cloud servers to achieve communication with BX-Y series asynchronous full-color control cards (hereinafter referred to as control cards).

The "Second Generation Cloud Protocol" adds a fixed format message header on the basis of the "Asynchronous Full Color Second Generation Communication Protocol" (hereinafter referred to as the "Second Generation Protocol"), which we call the protocol proxy layer. The "Second Generation Cloud Protocol" does not support the UDP communication commands in the "Second Generation Protocol"; theoretically, all HTTP communication commands in the "Second Generation Protocol" are supported, but some special commands are not described in this protocol.

In the control card, the UDP communication command is mainly used for the network-related settings of the card in the initial setting. Once the network setting is completed, HTTP command communication is mainly used: setting screen parameters, setting scan parameters, sending programs, and so on.

2. Protocol interface definition

2.1 Communication message format

- ✓ The storage of multi-byte parameters is unified as little-endian storage
- ✓ Uniform use of UTF-8 for character encoding
- ✓ Complete message includes message header,command and binary data (Not open)

Field name	Length(bytes)	Reference value	Description
message head			
MAGIC	4	'BXLC'	Used to identify the message category
FrameLengh	4	>=32	Including the whole head message length， max 65535（Tentative）
ProtocolVersion	1	0x07	Protocol version
ProtocolType	1	0x03	Protocol type
EncryptionType	1	0x96	Data encryption mode（Other data apart from head）： 0x96 - Original transmission, no encryption 0x01 - Ciphertext transmission method 1 0x02 - Ciphertext transmission method 2 0x03 - Ciphertext transmission method 3 0x04 - Ciphertext transmission method 4
EncryptionSeed	1	0x00	Encrypted seed
TextLengh	4	N	Unencrypted command length， max 65535（Tentative）
BinaryLengh	4	0	Unencrypted Binary data length， max 65535（Tentative）
Reserved	8	All 0x00	Reserve
MessageSequence	2	0x8000	The range of messages sent by the control card is 0x8000～0xFFFF The range of messages sent by the server is 0x0000～0x7FFF The login package uses 0x8001, and the server reply uses 0x0001 Heartbeat packets use odd numbers from 0x8003 to 0xFFFF The command sent by the server uses an even number from 0x0000 to 0x7FFF, and 0x8000 is fixed when the control card responds.
DataChecksum	1		XOR value of each byte before encryption for the command part and Binary data area
HeaderChecksum	1		XOR value of the first 31 bytes of the message header
Command part (JSON format, a total of N bytes for encryption)			

{
"name": "Command name"，
"input": {
"parameter1": "parameter 1",
"parameter2": "parameter 2",
……
"parameterN": "parameter N"			

} }
Binary data（Reserved Not open）

2.2 Command instruction

- ✓ All instructions are initiated by the host computer, and the controller receives the instructions and returns the execution results. All commands of the controller adopt Json format strings, and uniformly adopt UTF-8 encoding. The "key" in the Json key-value pair is case-insensitive, but it is recommended to use all lowercase; "[command name]" is also case-insensitive; everything else without special instructions is case-sensitive.
- ✓ "[Command name]" is case-insensitive, but for easy reading, the text is given in camel case
- ✓ Without special instructions, all commands are successfully executed and returned. If there is no "return parameter" item, the unified return format will be used, which will not be repeated in the following text. The general format is as follows:

```
{
    "name":"[Command name]"
}
```

- ✓ Without special instructions, all instructions will be returned if they fail to execute. The general format is as follows:

```
{
    "name":"[Command name]",
    "error": {
        "code":"[Error]",
        "mesg":"[error message]"
    }
}
```

- ✓ All the instruction samples in this article are aligned with format. In actual use, in order to reduce the data length, these format alignments can be removed.

2.3 Communication message sample

The check codes in all examples have not been actually checked.

2.3.1 Example 1: Login

- ✓ Controller message

	N	N+1	N+2	N+3
0x00	'B'	'X'	'L'	'C'
0x04	0x00000195			
0x08	0x07	0x03	0x96	0x00
0x0C	0x00000175			
0x10	0x00000000			
0x14	0x00000000			
0x18	0x00000000			
0x1C	0x8001		0x69	0x4A
0x20 ~ 0x194	{"name": "Login","input": {"pid":"501100303038473330000C07BB0A3956B", "barcode":"C0Y2L01804130033", "width": "512", "height": "384", "timezoneflag": "off", "timezoneserver": "", "timezone": "", "volume": "100", "controllertype": "9304", "ipmode": "static", "programlockedstatus": "off", "screenlockedstatus": "off", "screenonoffstatus": "on", "firmwareversion": "18042000"}}			

- ✓ Successful return message：

	N	N+1	N+2	N+3
0x00	'B'	'X'	'L'	'C'
0x04	0x00000031			

0x08	0x07	0x03	0x96	0x00
0x0C	0x00000011			
0x10	0x00000000			
0x14	0x00000000			
0x18	0x00000000			
0x1C	0x0001		0x76	0xD7
0x20 | 0x30	{"name": "login"}			

2.3.2 Example 2: Heartbeat

	N	N+1	N+2	N+3
0x00	'B'	'X'	'L'	'C'
0x04	0x00000020			
0x08	0x07	0x03	0x96	0x00
0x0C	0x00000000			
0x10	0x00000000			
0x14	0x00000000			
0x18	0x00000000			
0x1C	0x8033		0x00	0x14

2.3.3 Example 3: Timing instruction

✓ Server message

	N	N+1	N+2	N+3
0x00	'B'	'X'	'L'	'C'
0x04	0x0000007C			
0x08	0x07	0x03	0x96	0x00
0x0C	0x0000005C			
0x10	0x00000000			
0x14	0x00000000			
0x18	0x00000000			
0x1C	0x0056		0x5A	0xAB
0x20 ~ 0x7B	{"name": "SystemClockCorrect","input":{"datetime": "2018-3-20 12:00:00"}}			

✓ Successful return message：：

	N	N+1	N+2	N+3
0x00	'B'	'X'	'L'	'C'
0x04	0x00000040			
0x08	0x07	0x03	0x96	0x00
0x0C	0x00000020			
0x10	0x00000000			
0x14	0x00000000			
0x18	0x00000000			
0x1C	0x8056		0x46	0xF7
0x20	{"name": "systemclockcorrect"}			

| 0x3F	

✓ Fail to return message：

	N	N+1	N+2	N+3
0x00	'B'	'X'	'L'	'C'
0x04	0x00000080			
0x08	0x07	0x03	0x96	0x00
0x0C	0x00000060			
0x10	0x00000000			
0x14	0x00000000			
0x18	0x00000000			
0x1C	0x8056		0xF6	0xC7
0x20 | 0x7F	{"name": "systemclockcorrect", "error": {"code": 19, "mesg": "Command executed failed"}}			

2.4 Encryption Algorithm Description

✓ Ciphertext transmission method 1

Original seed“EncryptionSeed”The result of byte-by-byte XOR with the original data is regarded as the ciphertext.

✓ Ciphertext transmission method 2

Original seed “EncryptionSeed”The result of the XOR with the first byte of the original data is used as the first byte of the ciphertext, and at the same time as the seed for the next byte.

✓ Ciphertext transmission method 3

Every time the seed is XORed by one byte, rotate one bit to the left as the seed of the next byte.

✓ Ciphertext transmission method 4

Every time the seed is XORed by one byte, rotate one bit to the right as the seed of the next byte.

3. Command definition

3.1 Login and hearbeat

- ✓ As a control card, when the client mode is turned on, after successfully connecting to the server, it will first actively send a login instruction. The MessageSequence of the login message is fixed at 0x8001; the server reply is fixed at 0x0001.
- ✓ After successful login, when the system is idle, periodically (20s by default) will send "network heartbeat" messages to the server to indicate that the control card is working normally.

3.1.1 Login

- ✓ *Command sample:*

```
{
   "name": "Login",
   "input": {
       "pid": "501100303038473330000C07BB0A3956B",
       "barcode": "C0Y2L01804130033",
       "controllertype": "9304",
       "controllername": "XiZangNanLu",
       "clouduserid": "TEST",
       "width": "512",
       "height": "384",
       "timezoneflag": "off",
       "timezone": "Asia/Shanghai",
       "volume": "100",
       "programlockedstatus": "off",
       "screenlockedstatus": "off",
       "screenonoffstatus": "on",
       "firmwareversion": "18042000"
    }
}
```

All attributes in the sample must be reported.

- ✓ *Reply sample:*
  - ✓ Allow to login

```
{
    "name": "Login"
    "output": {
        "action": "auth",
        "delay": "30"
    }
}
```

  - ✓ Refused to login：

```
{
    "name": "Login",
    "output": {
        "save": "no",
        "action": "switch",
        "newhost": "<IP or domain name>",
        "newport": "<port>"
```

```
    }
}
OR
{
    "name": "Login",
    "output": {
        "action": "never"
    }
}
OR
{
    "name": "Login",
    "output": {
        "action": "retry",
        "delay": "30"
    }
}
```

Parameter instruction:

- ✓ "action":
  "auth": confirm to login
  "switch": Use "newhost"/"newport" to switch server
  "retry": At least wait for the time specified by "delay" and try to log in again
  "never": Do not log in again before restarting
- ✓ "delay": When "action" is "retry", it means to postpone the login time; when it is "auth", specify the idle heartbeat interval, the range is 3 ~ 60 seconds
- ✓ "newhost": ask for switch the server IP or domain name
- ✓ "newport": ask for switch server port
- ✓ "save": When "action" is "switch", whether to permanently reserve the newly switched server address, that is in cloud mode, whether the controller is still connected to the new server address after restarting. "yes": Reserve, "no": Not Reserve.

3.1.2 Heartbeat

- ✓ Only the message header, the message with the command part and Binary data empty is the heartbeat
- ✓ The server receives the heartbeat packet and no need to reply

3.2 Control card maintenance

3.2.1 reboot

✓ *Command sample:*

```
{
    "name": "reboot"
}
```

✓ *Reply sample:*

```
{
    "name": "reboot",
    "output": {
       "minwaittime":"30",
       "maxwaittime":"50"
    }
}
```

3.2.2 restartApp

✓ *Command sample:*

```
{
    "name": "restartApp"
}
```

3.2.3 systemClockCorrect

✓ *Command sample:*

```
{
    "name": "systemClockCorrect"
    "input": {
        "datetime": "2018-5-15 13:59:59",
        "isutc": "yes"
    }
}
```

Parameter instruction:

✓ "datetime": The format is the same as that of the Linux setting system time command "date", such as "yyyy-MM-dd hh:mm:ss"

✓ "isutc": Set whether to correct the controller time in UTC time. "yes": Calibrate in UTC time, "no": Calibrate in local time.

3.2.4 setLanguage

✓ *Command sample:*

```
{
    "name": "setLanguage"
    "input": {
       "language": "zh_CN"
    }
}
```

Parameter instruction:

✓ language":Language identification,see Appendix 7 (note: case sensitive).

✓ *Error Reply sample:*

```
{
    "error": {
        "code": "38",
        "mesg": "Language is not supported !"
    }
}
```

3.2.5 screenOnOff

✓ *Command sample:*

```
{
    "name": "screenOnOff"
    "input": {
        "screenonoffstatus": "on"
    }
}
```

Parameter instruction:

✓ "screenonoffstatus": "on"或 1 - 开机，"off"或 0 - 关机

3.2.6 customScreenOnOff

✓ *Command sample:*

```
{
    "name": "customScreenOnOff"
    "input": {
        "items": [{
            "starttime": "07:00:00",
            "action": "on"
        }, {
            "starttime": "07:59:59",
            "action": "off"
        }, {
            "starttime": "13:00:00",
            "action": "on"
        }, {
            "starttime": "13:59:59",
            "action": "off"
        }]
    }
}
```

This command is given in form of define multiple groups of actions, and support 8 groups.Parameter instruction:

✓ "starttime": format "hh:mm:ss"for the start time

✓ "action": "on"or 1 - switch on，"off"or 0 - switch off

3.2.7 CancelCustomScreenOnOff

✓ *Command sample:*

```
{
    "name": "cancelCustomScreenOnOff"
```

```
}
```

3.2.8 SetScreenSize

✓ *Command sample:*

```
{
    "name": "setScreenSize"
    "input": {
        "width": "1280",
        "height": "720"
    }
}
```

3.2.9 SetFoldScreen

✓ *Command sample:*

```
{
    "name": "setFoldScreen",
    "input": {
         "foldtype": "1",
         "foldcount": "3",
         "foldwidth": ["960","960","960"],
         "foldheight": ["64","128","128"]
    }
}
```

This command supports setting the folding screen, turning off the folding screen function, and supports the function of independently setting the screen parameters. Since this command needs to set the related parameters of the back level, please do not use this instruction before the setting of the back level is supported.Parameter instruction:

- ✓ "foldtype": Folding screen type. "0": close folding screen, "1": horizontal folding screen, "2": vertical folding screen (vertical folding screen is not supported currently)
- ✓ "foldcount": foldcount, >=1
- ✓ "foldwidth": The width of each line. When "foldtype"="2", only the first value in the array is taken
- ✓ "foldheight": The width of each column. When "foldtype"="1", only the first value in the array is taken

Description of parameter usage conditions:

1. The controller models that support folding screens are: Y2L, Y2, Y3.
2. The "foldcount" of Y2L is ≤ 2; the "foldcount" of Y2 is ≤4, and the "foldcount" of Y3 is ≤ 8.
3. When "foldtype" is "1", the following conditions need to be met:
   - ✓ "foldcount">1
   - ✓ The number of members in the "foldwidth" list is equal to the number of folds specified by "foldcount"
   - ✓ Each value in the "foldwidth" list is greater than or equal to 64 and less than or equal to 2048
   - ✓ The sum of all width values in the "foldwidth" list is greater than 2048; less than 16384

✓ The product of the first height value in the "foldheight" list multiplied by "foldcount" is less than or equal to "height"
4.When "foldtype" is "2", the following conditions need to be met: (not currently supported)
✓ "foldcount" is greater than 1
✓ The number of members in the "foldheight" list is equal to the number of folds specified by "foldcount"
✓ Each value in the "foldheight" list is greater than or equal to 64 and less than or equal to 2048
✓ The sum of all height values in the "foldheight" list is greater than 2048 and less than 16384
✓ The product of the first width value in the "foldwidth" list multiplied by "foldcount" is less than or equal to "width"

3.2.10 SetVolume

✓ *Command sample:*

```
{
    "name": "setVolume",
    "input": {
        "volume": "50"
    }
}
```

Parameter instruction:

✓ "volume": Adjust system volume percentage,0-100

3.2.11 setOutputType

✓ *Command sample:*

```
{
    "name": "setOutputType",
    "input": {
        "outputtype": "LCD"
    }
}
```

The BX-Y series does not currently support switching output modes.

Parameter instruction:

✓ "outputtype": output mode，"LCD"或"DVI"("HDMI")

3.2.12 SetTimeZoneServer

✓ *Command sample:*

```
{
    "name": "setTimeZoneServer",
    "input": {
        "timezoneflag": "on",
        "timezone": "Asia/Shanghai",
        "timezoneserver": "120.24.166.46"
    }
```

```
}
```

Parameter instruction:

- ✓ "timezoneflag": "on" or 1-enable, "off" or 0-disable
- ✓ "timezoneserver": Set the IP address of a feasible time server. Multiple IPs can be set at the same time, separated by ",". If the parameter is Empty"", the default time server (0.pool.ntp.org, 1.pool.ntp.org, 2.pool.ntp.org, 3.pool.ntp.org) will be used
- ✓ "timezone": Set the time zone of the controller. If the parameter is Empty"", use the default time zone "Asia/Shanghai". It is not necessary to turn on the automatic time service function and only set the time zone separately.

3.2.13 SystemBrightness

✓ *Command sample:*

```
{
    "name": "systemBrightness",
    "input": {
        "brightness": "205",
        "changemode": "yes"
    }
}
```

Parameter instruction:

- ✓ "brightness": The brightness value to be adjusted, the range is 1～255, 255 is the brightest
- ✓ "changemode": Whether to change the brightness mode. "yes": change the brightness mode, "no": temporarily adjust the brightness without changing the original brightness mode. The default is "yes".

3.2.14 CustomBrightness

✓ *Command sample:*

```
{
    "name": "customBrightness",
    "input": {
        "items":["1","2","3",...,"48"]
    }
}
```

Parameter instruction:

- ✓ "items": 48 brightness values ranging from 1 to 255, corresponding to the brightness of 48 and a half hours a day

3.2.15 AutoBrightness

✓ *Command sample:*

```
{
    "name": "autoBrightness",
    "input": {
        "brightnessValue": ["1","1","2", ... ,"255"],
        "sensorValue": ["2","100","600", ... ,"65535"],
```

```
        "sensorAddress": "0x200"
    }
}
```

Parameter instruction:

- ✓ "sensorValue": 16 sensor values ranging from 0 to 65535, corresponding to 16 thresholds
- ✓ "brightnessValue": 16 values ranging from 1 to 255, corresponding to 16 brightness adjustment values
- ✓ "sensorAddress": Refer to Appendix5; besides the address corresponding to the multi-function card, the available addresses also include the onboard I2C brightness sensor 0x823

3.2.16 GetProperty

✓ *Command sample:*

```
{
    "name": "getProperty",
    "input": {
        "controllertype": "",
        "screenonoffstatus": "",
        "firmwareversion": ""
    }
}
```

This command is a query command. The subkeys in "input" are the attributes to be queried (their "values" are all Empty), and the number is variable. See appendix

✓ *Reply sample:*

```
{
    "name": "getProperty",
    "output": {
        "controllertype": "9048",
        "screenonoffstatus": "1",
        "firmwareversion": "18051400"
    }
}
```

Returns the values of all query parameters. If there are non-existent parameters, the command execution fails and an error message is returned.

3.2.17 SetProperty

✓ *Command sample:*

```
{
    "name": "setProperty",
    "input": {
        "controllername": "test",
        "serverip": "192.168.88.123",
        "serverport": "16800"
    }
}
```

3.2.18 GetState

```
{
    "name": "getState",
    "input": {
```

```
        "delay": "20",
        "rtctime": "",
        "gps": {
            "longitude": "",
            "latitude": "",
            "altitude": "",
            "angle": "",
            "speed": ""
        }
    }
}
```

Parameter instruction:

- ✓ "delay"：Loop recovery period, the value range is "3"~"120" in unit second. When the "delay" value is greater than "1000", it means that the loop reply is closed. The value range is "1020"~"1120". The value minus 1000 is the heartbeat packet reply interval. For example: "1020" means to close the loop reply, and the heartbeat interval is set to 20 seconds. If this parameter is not passed, the status of cyclic reply will not be changed.
- ✓ "rtctime"：Need to return RTC time.
- ✓ "gps"：Need to return GPS information. Contains the following attributes:
  - ✓"longitude":Longitude, E/Wdddmm.mmmmmm degree minutes.
  - ✓"latitude": Latitude, N/Sddmm.mmmmmm degree minutes.
  - ✓"altitude": Altitude. Range -9999.9 ~ 99999.9 meters.
  - ✓"angle": Azimuth angle. The range is 0.0° ~ 359.9°.
  - ✓"speed": Speed. Unit: km/h.

This command is a query command, which is used to query the current state of the controller when it is running. The subkeys in "input" are the attributes to be queried (their "values" are all Empty), and the number is variable. Currently, it supports the query of "rtctime" and "GPS" information.

✓ *Reply sample:*

```
{
    "name": "controllerState",
    "output": {
        "rtctime": "2011-8-30 9:50:38",
        "gps": {
            "longitude": "N3110.716557",
            "latitude": "E12123.715604",
            "altitude": "42.7",
            "angle": "232.0",
            "speed": "0.0"
        }
    }
}
```

The heartbeat packet is replaced in the loop reply, and the message sequence number of the heartbeat (MessageSequence) is used. Turn off the loop reply, and the heartbeat packet will reply normally.

3.2.19 updateFirmware

✓ *Command sample:*

```
{
    "name": "updateFirmware",
    "input": {
```

```
        "firmwarepath":"backup/BX-Y3_V18051400.bxf"
    }
}
```

Use the specified firmware file to upgrade the control card. Before using this command, you need to use the "download file from URL" command in advance to upload the firmware file to the control card "backup" directory or other available directories, avoid using the "update" directory directly, and then point the "firmwarepath" to the file.

3.2.20 RestoreFactory

✓ *Command sample:*

```
{
    "name": "restoreFactory",
    "input": {
        "saveconfig":"yes"
    }
}
```

This command is used to restore the firmware to the factory version

Parameter instruction:

- ✓ “saveconfig”：Identifies whether to save the configuration file. "Yes": Save the existing configuration. Saved by default.

✓ *Reply sample:*

```
{
    "name": "restoreFactory",
    "output": {
        "minwaittime": "30",
        "maxwaittime": "50"
    }
}
```

Parameter instruction:

- ✓ “minwaittime”：Minimum wait time
- ✓ “maxwaittime”： maximum wait time

3.3 Disk Management

3.3.1 QueryDiskList

✓ *Command sample:*

```
{
    "name": "queryDiskList"
}
```

✓ *Reply sample:*

```
{
    "name": "queryDiskList",
    "output": {
        "items": ["emmc","sd","usb1"]
    }
}
```

Note: The number of elements in the returned "items" depends on the actual situation of the controller. If it is Empty, it means that the control card is abnormal. "emmc", "sd", "usb1" are the three media supported by the control card at this stage.

3.3.2 queryDisk

✓ *Command sample:*

```
{
    "name": "queryDisk",
    "input":  {
        "storagemedia": "emmc"
    }
}
```

✓ *Reply sample:*

```
{
    "name": "queryDisk",
    "output": {
        "totalsize": "3200000000",
        "usedsize": "1000000000",
        "freesize": "2199000000",
        "usedpercent": "31.3%",
        "filesystem": "ext4"
    }
}
```

Parameter instruction:

- ✓ "totalsize": total capacity in bytes
- ✓ "usedsize": Empty room has been used
- ✓ "freesize": Available Empty room
- ✓ "usedpercent": the percentage of used Empty room
- ✓ "filesystem": file system type, such as ext4, vfat, etc.

3.3.3 SetStorageMedia

✓ *Command sample:*

```
{
    "name": "setStorageMedia",
    "input": {
        "storagemedia": "emmc"
    }
}
```

3.4 File management

3.4.1 FindFile

✓ *Command sample:*

```
{
    "name": "findFile",
    "input": {
        "delay": "0",
        "items": [{
            "filename": "share/123.jpg"
        }, {
            "filename": "lists/plist1.xml"
        }]
    }
}
```

✓ "delay": Asynchronous reply delay time (in seconds), "0" means immediate reply, and the default value of "0" is used if this parameter is not transmitted. Value range: "0"~"120".

✓ *Reply sample:*

```
{
    "name": "findFile",
    "output": {
        "items": [{
            "filename": "share/123.jpg",
            "size": "125688",
            "mtime": "2017-12-13 13:03:05"
        }, {
            "filename": "lists/plist1.xml",
            "size": "0",
            "mtime": ""
        }]
    }
}
```

✓ "size": File size information

✓ "mtime": the last modification time of the file, if it is Empty, it means the file does not exist

3.4.2 moveFile

✓ *Command sample:*

```
{
    "name": "moveFile",
    "input": {
        "src": "backup/file1.txt",
        "dst": "share/file2.txt",
        "signature": "Rd+f … ew==",
        "digest": "sha1",
        "offset": "0",
        "length": "1024",
        "fingerprint":"31:F2:17:E5:25:4D:61:EF:AF:4F:29:CF:56:2B:F5:86:DC:DE:F2:
65"
    }
}
```

Move the source file to the destination file, which can be used for renaming. If the source does not contain the path, but only the file name, the corresponding file in the upload temporary directory will be moved to the destination by default.

When the file authentication switch is turned on, when you move the file, you need to add the digital signature information of the moved file summary and the corresponding signature certificate.

- ✓ "src": The path where the file to be moved is located, that is, the source path. If only the file name is included without the path, the default is the path where the "temporary upload directory" is located
- ✓ "dst": The target path of the file movement
- ✓ "signature": BASE64 encoding for digital signature of abstract content
- ✓ "digest": Digest algorithm: "sha1", "md5", the default is "sha1"
- ✓ "offset": the offset of the starting position of the summary content, the default is "0"
- ✓ "length": The length of the summary content interception, the default is the length after "offset". The length range is greater than or equal to 1MB and less than or equal to 8MB. If the total file length is less than 1MB, take the full file length.
- ✓ "fingerprint": The fingerprint of the signature certificate in SHA1 format

Do not use this command to modify the name of the dedicated directory under the user's working directory.

3.4.3 copyFile

✓ *Command sample:*

```
{
    "name": "copyFile",
    "input": {
        "src": "backup/file1.txt",
        "dst": "share/file2.txt"
    }
}
```

Copy the source file to the destination file. If the source does not contain path but only the file name, the corresponding file in the upload temporary directory will be copied to the destination by default.

3.4.4 deleteFile

✓ *Command sample:*

```
{
    "name": "deleteFile",
    "input": {
        "items": [
            "123.jpg",
            "lists/plist1.xml"
        ]
    }
}
```

Delete the files specified in the "items" list. If the file name does not contain the path, but only the file name, delete the corresponding file in the upload temporary directory.

3.4.5 downloadFileFromURL

✓ *Command sample:*

```
{
    "name": "downloadFileFromURL",
    "input": {
        "failonwaitingtimeout":"10",
        "downloadmode":"queue",
        "downloadtimes":"1",
        "updatetime":"0",
        "items": [{
            "srcurl": "<Need to download the full link>",
            "dstpath": "<Target path on the controller>",
            "dstfilename":"<Target file name>",
            "size": "<file size>",
            "signature": "Rd+f … ew==",
            "digest": "sha1",
            "offset": "0",
            "length": "1024",
            "fingerprint":"31:F2:17:E5:25:4D:61:EF:AF:4F:29:CF:56:2B:F5:86:DC:D
E:F2:65"
        }, {
            "srcurl": "<Need to download the full link>",
            "dstpath": "<Target path on the controller>",
            "dstfilename":"<Target file name>",
            "size": "<file size>",
            "signature": "6Ieq … 6LSl",
            "digest": "sha1",
            "offset": "50",
            "length": "512",
            "fingerprint":"31:F2:17:E5:25:4D:61:EF:AF:4F:29:CF:56:2B:F5:86:DC:D
E:F2:65"
        }]
    }
}
```

- ✓ "items"：Give a list of files to download
  - ✓ "srcurl"： Need to download a complete and valid file URLpath，例如：
    ftp://[username]:[password]@[ip address or domain name]/[path]/[file name]
    http://[username]:[password]@[ip address or domain name]/[path]/[file name]
  - ✓ "dstpath"：controller working path，example：share/
  - ✓ "dstfilename"：the saved file name
  - ✓ "size"：file size

When open the File authentication switch，The command needs to include the following parameters for authentication of the downloaded file:

- ✓ "signature": BASE64 encoding for digital signature of abstract content
- ✓ "digest": Digest algorithm: "sha1", "md5", the default is "sha1"
- ✓ "offset": the offset of the starting position of the summary content, the default is "0"
- ✓ "length": The length of the summary content interception, the default is the length after "offset". The length range is greater than or equal to 1MB and less than or equal to 8MB. If the file is less than 1MB, take the full file length.

- ✓ "fingerprint": The fingerprint of the signature certificate in SHA1 format
- ✓ "downloadmode": File download mode, "queue"-files are downloaded in a queue at one time; "batch"-files are downloaded in batches, up to three files can be downloaded at the same time.
- ✓ "downloadtimes": The number of file downloads, 0-unlimited times, repeat downloads; greater than or equal to 1-the task will be set to complete when the number of downloads is reached. The number of downloads here refers to the number of successes. The more commonly used one is 1-single download, and ordinary tasks only need to be downloaded once. (Note: The total size of all non-single download files cannot exceed 50 megabytes)
- ✓ "failonwaitingtimeout": The timeout period, in seconds. If the timeout period expires and the download task is still waiting for download, it will be set to download failed status; setting 0 will disable this function, and the task will wait until the download is completed or cancelled.
- ✓ "updatetime": When repeating downloads, the time between two downloads; "downloadtimes" is effective when it is not 1, and must be greater than "failonwaitingtimeout"

✓ *Reply sample:*

```
{
    "name": "downloadFileFromURL",
    "output": {
        "id": "download task id"
    }
}
```

The returned "id" is used for subsequent operations such as querying progress and canceling tasks.

3.4.6 QueryDowloadProgress

✓ *Command sample:*

```
{
    "name": "queryDownloadProgress",
    "input": {
        "items": {
        "delay": "0",
        "id": "download task id"
    }
}
```

- ✓ Asynchronous reply delay time (in seconds). "0" means reply immediately. If this parameter is not passed, the default value "10" is used. Value range: "0"~"120".
- ✓ "id": "downloadFileFromURL" command return <download task id>。

✓ *Reply sample:*

```
{
    "name": "queryDownloadProgress",
    "output": {
        "id": "<task id>",
        "status": "failure",
        "rate": "10",
```

```
        "errorinfo": [{
            "url": "<download error url>",
            "message": "<error message>"
        },{
            "url": "<download error url>",
            "message": "<error message>"
        }]
    }
}
```

Parameter instruction:

- ✓ "id": task id
- ✓ "status": download status
- ✓ "waiting": waiting for downloading
- ✓ "downloading": downloading
- ✓ "complete": The download is complete
- ✓ "failure": download failed
- ✓ "notfound": The task specified by <task id> does not exist
- ✓ "rate": the total download progress in thousand-point ratio, 0～1000 "errorinfo": Error information, only exists when "status" is "failure", and is given in the form of a list
- ✓ "url": the wrong url
- ✓ "message": error message

3.4.7 cancelDownload

✓ *Command sample:*

```
{
    "name": "cancelDownload",
    "input": {
        "id": "<task id>"
    }
}
```

Cancel the task specified by "id". When "id" is Empty, all downloads will be canceled. **Please use caution to cancel all downloads.**

3.4.8 uploadFileToFtpServer

✓ *Command sample:*

```
{
    "name": "uploadFileToFtpServer",
    "input": {
        "host": "192.168.88.222",
        "port": "21",
        "user": "guest",
        "password": "guest",
        "srcfile": "share/example.bmp",
        "dstfile": "exampledir/exampleDst.bmp"
    }
}
```

Parameter instruction:

- ✓ "host": FTP server host, which can be a domain name, provided that the control card is set with a domain name server

- ✓ "port": FTP server port, without this item, 21 is used by default
- ✓ "user": Username
- ✓ "password": Password "srcfile": the file in the user directory of the control card
- ✓ "dstfile": The valid path in the server, if there is no file name (ends with '\'), the source file name is used

✓ *Reply sample:*

```
{
    "name": "uploadFileToFtpServer",
    "output": {
        "size": "10921"
    }
}
```

Parameter instruction:

- ✓ "size": The size of the file in the control card may change

3.5 Program management

3.5.1 play

✓ *Command sample:*

```
{
    "name": "play",
    "input": {
        "type":"program",
        "playlist": "lists/plist1.xml"
    }
}
```

Parameter instruction:

- ✓ "type": Specify the type of program to start playing, which can be "program"-normal program, "bulletin"-bulletin area program, "dynamic"-saved dynamic area program (the controller will first clear all the programs that are currently playing in the memory) Dynamic area), it can also be designated as "all"-all programs, including ordinary programs, announcement area programs and saved dynamic area programs. There is a separate command "Play Announcement" to play announcements. The dynamic zone playback uses the "Update Play Dynamic Zone" command.
- ✓ "playlist": Only applicable to normal program "program"; when it is Empty, the control card will automatically search for available playlists.

Ordinary programs, programs in the announcement area, and programs in the dynamic area are independently controlled to play, and the three do not affect each other if they are not related.

Using this command can only play the saved dynamic area, and clear all dynamic areas in the content being played at the same time.

After the controller restarts, it will automatically play the normal programs specified by "playlist", the announcements that have not been deleted ("Delete Announcement" command), and the saved dynamic area ("Save Dynamic Area File" command).

✓ *Reply sample:*

```
{
    "name": "play",
    "output": {
        "message": "lists/plist1.xml",
        "type": "program"
    }
}
```

✓ *Error Reply sample:*

```
{
    "remotefunction": {
       "name": "play",
       "error": {
           "code": 30,
           "mesg": "Mediaplayer process play failed"
       }
    }
}
```

3.5.2 stopPlay

✓ *Command sample:*

```
{
    "name": "stopPlay",
    "input": {
        "type":"program",
    }
}
```

Parameter instruction:

✓ "type": Specify the type of program to stop playing, which can be "program"-normal program, "bulletin"-announcement area program, "dynamic"-all live dynamic areas, or "all"-all programs, Including ordinary programs, announcement area programs and all on-air dynamic area programs. To stop playing announcements, you can use the "Stop Broadcasting Announcement" command. To stop playing the dynamic area, you can use the "Clear Dynamic Area" command.

Similar to the "start playing" command, ordinary programs, announcement area programs, and dynamic area programs are stopped separately. If there is no relationship, the three will not affect each other.

Using this command to stop the dynamic zone will clear all the dynamic zones that are playing. You can use the "Clear Dynamic Area" command to specify clear.

✓ *Reply sample:*

```
{
    "name": "stopPlay",
    "output": {
        "type": "program"
    }
}
```

✓ *Error Reply sample:*

```
{
    "remotefunction": {
        "name": "stopPlay",
        "error": {
            "code": 30,
            "mesg": "Mediaplayer process stopPlay failed"
        }
    }
}
```

3.5.3 lockProgram

✓ *Command sample:*

```
{
    "name": "lockProgram",
    "input": {
        "programlockedstatus": "on",
        "programlockedname": "program_0"
    }
}
```

This command is only for ordinary programs.

Parameter instruction:

- ✓ "programlockedstatus": "lock" or 1-locked, "unlock" or 0-unlocked
- ✓ "programlockedname": The name of the program, specified by the "name" attribute in the program file

✓ *Reply sample:*

```
{
    "name": "lockProgram",
    "output": {
        "type": "true"
    }
}
```

Parameter instruction:

- ✓ "type": Corresponding to "programlockedstatus" in the command, true-locked, false-unlocked

✓ *Error Reply sample:*

```
{
    "remotefunction": {
        "name": "lockProgram",
        "error": {
            "code": 30,
            "mesg": "Mediaplayer process lockProgram failed"
        }
    }
}
```

3.5.4 checkPlayer

✓ *Command sample:*

```
{
    "name": "checkPlayer"
}
```

✓ *Reply sample:*

```
{
    "name": "checkPlayer",
    "output": {
        "programlist":"lists/plist1.xml",
        "programname":"program/program_1.xml",
        "insertlist":"lists/plist1.xml",
        "playstatus":"Lock"
}
```

Parameter instruction:

- ✓ "programlist": the currently playing list file
- ✓ "insertlist": Only when it is being inserted will it return to the list file currently being inserted
- ✓ "programname": the currently playing program file
- ✓ "playstatus": the lock status of the current program, "Lock" or "Unlock"

3.5.5 clearUselessMaterial

✓ *Command sample:*

```
{
    "name": "clearUselessMaterial"
}
```

Delete all playlist files, program files, and material files except the files related to the current playlist. If the control card is in the stop state, this command will delete all playlist files, program files and material files. This command only affects the files in the lists, programs, and share directories, and does not traverse other directories. Therefore, program-related files should be placed in these three directories as much as possible.

3.5.6 clearAllProgram

✓ *Command sample:*

```
{
    "name": "clearAllProgram",
    "input": {
        "keepmaterial":"yes"
    }
}
```

Parameter instruction:

✓ "keepmaterial": Reserve mark。"yes":Reserve, "no": not reserve。

This command stops playing all programs, and deletes the playlists and program materials of all types of programs (optional).

3.5.7 insertList

✓ *Command sample:*

```
{
    "name": "insertList",
    "input": {
        "playlist":"/lists/a.xml",
        "count":"0",
        "duration":"180"
    }
}
```

Parameter instruction:

✓ "playlist": Specify the program list file to be interrupted, which needs to be uploaded to the control card in advance; if "playlist" is Empty, it means that the previous interruption is cancelled

✓ "count": Specify the number of times all programs in the program list file are played.

✓ "duration": Specify the total playing time of all programs in the program list file, valid when "count" is 0.

✓ Additional information:

✓ Insert program list, ignore the priority of all programs in it.

✓ Insert program list, ignore the time-related attributes of all programs in it.

- ✓ Insert programs list, ignore the carousel related attributes of all programs; all programs will be rotated in order for the number of times specified by "count" or for the duration specified by "duration".
- ✓ The interrupted program list will be played immediately, and all dynamic areas will be stopped at the same time; during the interrupted broadcast, the remote control will not be responded to; the previous playlist will be restored after the interrupted program list is played.

✓ *Error Reply sample:*

```
{
    "remotefunction": {
        "name": "insertList",
        "error": {
            "code": 30,
            "mesg": "Mediaplayer process insertList failed"
        }
    }
}
```

3.5.8 stopInsertList

✓ *Command sample:*

```
{
    "remotefunction": {
        "name": "stopInsertList"
    }
}
```

3.5.9 switchplayermode

✓ *Command sample:*

```
{
    "remotefunction": {
        "name": "switchplayermode",
        "input": {
            "playermode":"normal"
        }
    }
}
```

Parameter instruction:

✓ "playermode": Play mode. "normal/0": asynchronous mode, "sync/1": synchronous mode.

Additional information:

- ✓ Currently only BX-Y5E supports this command, and other models will reply Error when receiving this command.
- ✓ In synchronous mode, shield asynchronous program playback instructions (Play, UpdateDynamic, UpdateDynamicUnits, etc.), and reply to Error.
- ✓ In synchronization mode, U disk program playback and import are not supported.

3.6 Font library management

3.6.1 queryFont

✓ *Command sample:*

```
{
    "name": "queryFont"
}
```

✓ *Reply sample:*

```
{
    "name": "queryFont",
    "output": {
        "systemfont": [{
            "fontname": [{
                "family":"Simsun",
                "familylang":"en"
            },{
                "family":"宋体",
                "familylang":"zh-cn"
            }],
            "fontstyle": [{
                "style":"Regular",
                "stylelang":"en"
            },{
                "style":"常规",
                "stylelang":"ca"
            }]
        },{
            "fontname": [{
                "family":"SimHei",
                "familylang":"en"
            },{
                "family":"Bold",
                "familylang":"zh-cn"
            }],
            "fontstyle": [{
                "style":"Regular",
                "stylelang":"en"
            }]
        }],
        "customfont": [{
            "fontname": [{
                "family":"fontname1_en",
                "familylang":"en"
            },{
                "family":"fontname1_zh",
                "familylang":"zh-cn"
            }],
            "fontstyle": [{
                "style":"Regular",
                "stylelang":"en"
            },{
                "style":"Normal",
                "stylelang":"ca"
```

```
            }]
        }, {
            "fontname": [{
                "family":"fontname2_en",
                "familylang":"en"
            },{
                "family":"fontname2_zh",
                "familylang":"zh-cn"
            }],
            "fontstyle": [{
                "style":"Regular",
                "stylelang":"en"
            }]
        }]
    }
}
```

"systemfont" returns the font library embedded in the control card and cannot be deleted; "customfont" returns the font library installed by the user, which can be deleted. All fields are obtained by querying the font file.

Parameter instruction:

- ✓ `"fontname": font name description`
  - ✓ "family": the actual font name,
  - ✓ "familylang": The language of the font name, such as "en", "zh-cn", etc., corresponds to "family" one-to-one
  - ✓ "fontstyle": Description of font style
  - ✓ "style": specific style name, such as "Regular", "Normal", "normal", "bold", etc.
  - ✓ "stylelang": The language of the style name, such as "en", "zh-cn", etc., which corresponds to "style" one-to-one

3.6.2 installFont

✓ *Command sample:*

```
{
    "name": "installFont",
    "input": {
        "items":[
            "fonts/a.ttf",
            "share/b.ttf"
        ]
    }
}
```

Parameter instruction:

- ✓ `"items": List of font file paths that need to be installed`

The font file needs to be uploaded to the control card in advance, which can be anywhere in the user directory. It is recommended to use the "fonts" directory. If it is not under "fonts", it will be automatically moved to the "fonts" directory when the command is executed.

✓ *Reply sample:*

```
{
    "name": "installFont",
    "output": {
        "minwaittime":"5",
```

```
        "maxwaittime":"15"
    }
}
```

3.6.3 queryFontExist

✓ *Command sample:*

```
{
    "name": "queryFontExist",
    "input": {
        "delay": "0",
        "items": [{
            "fontname": "SimSun"
        },{
            "fontname": "SimHei"
        }]
    }
}
```

✓ "delay": Asynchronous reply delay time (in seconds), "0" means immediate reply, and the default value of "10" seconds is used if this parameter is not transmitted. Value range: "0"~"120".

✓ *Reply sample:*

```
{
    "name": "queryFontExist",
    "output": {
        "items": [{
            "fontname": "SimSun",
            "status": "exist"
        }, {
            "fontname": "SimHei",
            "status": "notfound"
        }]
    }
}
```

This command is used to check whether the font exists and whether it is installed successfully.

✓ "fontname": the query font name

✓ "status": check status, "exist" – exist/ install successfully, "notfound" –not exist

3.6.4 deleteFont

✓ *Command sample:*

```
{
    "name": "deleteFont",
    "input": {
        "items":[
```

```
            "SimSun"
        ]
    }
}
```

Each sub-item in the "items" list is the font name, and English names are recommended. Since a font file may contain multiple fonts, deleting a specified font will actually delete the font file corresponding to the font, so all the font files contained in the font file will be deleted. This directive is still being perfected and has defects.

3.7 Sensor management

3.7.1 listSensormodbus

✓ *Command sample:*

```
{
    "name": "listSensormodbus "
}
```

✓ *Reply sample:*

```
{
    "name": "listSensormodbus ",
    "output" : {
        "items": [
            "0x800",
            "0x2000",
            "0x8000"
        ]
    }
}
```

This command is used to list all modbus es on which the control card may have installed sensors.

Parameter instruction:

✓ "items": The first address of the modbus of all possibly installed sensors, See Appendix5

3.7.2 searchSensor

✓ *Command sample:*

```
{
    "name": "searchSensor"
    "input": {
        "sensormodbus ":[
            "0x8000",
            "0x800
        ]
    }
}
```

Asynchronous command, need to be used in conjunction with the "listSensor" command.

Parameter instruction:

✓ "sensormodbus ": The modbus list of sensors that may have been installed, generally in the result returned by "listSensormodbus "; when it contains "*", query all supported/connected sensor modbus es;See Appendix5

✓ *Reply sample:*

```
{
    "name": "searchSensor",
    "output" : {
        "minwaittime": "5",
        "maxwaittime": "15"
    }
}
```

3.7.3 Get listSensor

✓ *Command sample:*

```
{
    "name": "listSensor"
}
```

✓ *Reply sample:*

```
{
    "name": "listSensor",
    "output" : {
        "sensorList": [{
            "sequence": "0x01",
            "sensorAddress": "0x823",
            "sensorState": "0xFF",
            "value": "456"
         }, {
            "sequence": "0x03",
            "sensorAddress": "0x8000",
            "sensorState": "0xFF",
            "value": "78.5"
        }]
    }
}
```

Returns the result of the last "searchSensor" command.

Parameter instruction:

- ✓ "sequence": Sensor function number, See Appendix6
- ✓ "sensorAddress": sensor address, See Appendix 5
- ✓ "sensorState": Whether the sensor is online (usually online), 0xFF-online, 0x00-not online
- ✓ "value": sensor value, default configuration is used when it is not configured; integer or floating-point string

3.7.4 getSensorState

✓ *Command sample:*

```
{
    "name": "getSensorState",
    "input": {
        "sequence": "1",
        "sensorAddress": "0x8000"
    }
}
```

✓ *Reply sample:*

```
{
    "name": "getSensorState",
    "output":  {
        "sequence": "1",
        "sensorAddress": "0x8000",
```

```
        "sensorState": "0xFF",
        "value": "12345", ## The composite sensor has multiple values/connected
in series
        "level": ""  ##Brightness value is one more current brightness level
    }
}
```

Parameter instruction:

- ✓ "sequence": Sensor function number, See Appendix6
- ✓ "sensorAddress": Sensor address , See Appendix 5
- ✓ "sensorState": Whether the sensor is online (usually online), 0xFF-online, 0x00-not online
- ✓ "value": sensor value, default configuration is used when it is not configured; integer or floating-point string
- ✓ "level": brightness level, additional value when "sequence" is "1" (brightness sensor)

3.7.5 bindRelay

✓ *Command sample:*

```
{
    "name":"bindRelay",
    "input": {
        "updatetime": "5",
        "sensorList": [ {
            "sequence": "2",
            "sensorAddress": "0x8000",
            "relayType": "0",
            "relaySwitch": "0x200",
            "unitType": "0",
            "unitCoefficient": "0.1",
            "decimal": "1",
            "correction": "-0.1",
            "threshMode": "1",
            "threshValue": "40.2"
        },{
            "sequence": "0x03",
            "sensorAddress": "0x8000",
            "relayType": "1",
            "relaySwitch": "0x100",
            "unitType": "0",
            "unitCoefficient": "0.01",
            "decimal": "2",
            "correction": "0.05",
            "threshMode": "1",
            "threshValue": "58.50"
        }]
    }
}
```

Parameter instruction:

- ✓ "updatetime": The sensor detection period in seconds,
- ✓ "sensorList": sensor list bound to relay
  - ✓ "sequence": Sensor function number, See Appendix6
  - ✓ "sensorAddress": Sensor address , See Appendix 5

- ✓ “relayType”：`"relayType": On-board relay module control type; 1-high point level trigger, 0-low level trigger; Y series use low level trigger mode at this stage.`
- ✓ “"relaySwitch": 32-bit unsigned integer number, each bit corresponds to a relay; when a bit is 0, it does not control, when it is 1, it controls the relay of the corresponding serial number; 0~7 corresponds to the first multi-function under #1 network port The 8 relays of the card, 8 and 9 correspond to the external relays controlled by the two GPIOs on the board. Only the 8 relays of the first multi-function card under the #1 network port and the external relays controlled by the GPIO on the board are allowed to be controlled through the sensor
  "decimal": decimal places
  "unitType": sensor unit identification
  Temperature sensor: 0-Celsius; 1-Fahrenheit
  Liquid level sensor: 0-status (whether or not alarm); 1-liquid level value
  Dust sensor: 0-PM2.5; 1-PM10
- ✓ "unitCoefficient": Unit conversion coefficient, floating-point character string, the default is 1.0; for example: 0.001-can convert the distance sensor's millimeter value into meters
- ✓ "correction": correction value, floating-point character string.
- ✓ Sensor final value = [original value] x [unitCoefficient] + [correction]
- ✓ "threshMode": Threshold judgment mode. ‘0’-disconnect the relay when it is less than the threshold, otherwise it will pull in; ‘1’-disconnect the relay when it’s greater than the threshold, or pull it in.
- ✓ "threshValue": Threshold value, floating-point string. The fractional part outside the range specified by "decimal" is truncated.

3.7.6 unbindRelay

- ✓ *Command sample:*

```
{
    "name":"unbindRelay",
    "input": {
        "sensorList": [ {
            "sequence": "2",
            "sensorAddress": "0x8000"
        }, {
            "sequence": "0x03",
            "sensorAddress": "0x8000"
        }]
    }
}
```

Parameter instruction:

- ✓ `"sensorList": the sensor list that needs to cancel the relay binding relationship, when it is ["*"], it means cancel all the relay binding relationships`

3.7.7 screenOnOffRelay

- ✓ *Command sample:*

```
{
    "name": "screenOnOffRelay",
    "input": {
        "relayAddress": "0x8000",
        "relayType": "0",
        "relaySwitch":"0xff"
    }
}
```

Parameter instruction:

- ✓ “relayAddress”：Relay address, similar to the "sensorAddress" of the sensor（see Appendix5）
  0x0100-External relay controlled by GPIO on board
  0x8000-#1 The relay on the first multi-function card under the network port
- ✓ "relayType": Onboard relay module control type; 1-high point level trigger, 0-low level trigger
- ✓ "relaySwitch": 16-bit unsigned integer number, each bit corresponds to a relay; when a bit is 0, it does not control, when it is 1, it controls the relay of the corresponding serial number; 0~7 corresponds to the first multi-function under #1 network port The 8 relays of the card, 8 and 9 correspond to the external relays controlled by the two GPIOs on the board; the others are reserved. The sensor is only allowed to control the 8 relays of the first multi-function card under the #1 network port and the external relays controlled by the GPIO on the board.

3.7.8 controlRelay

- ✓ *Command sample:*

```
{
    "name": "controlRelay",
    "input": {
        "mask": "0x00ff",
        "action": "0x00ff"
    }
}
```

Parameter instruction:

- ✓ "mask": The mask of the relay that needs to be controlled, a 16-bit unsigned integer number, each bit matches a relay, when it is 1, the relay with the corresponding serial number needs to be controlled, otherwise skip it. 0~7 correspond to the 8 relays of the first multi-function card under the #1 network port; 8 and 9 correspond to the external relays controlled by the two GPIOs on the board; others are reserved.
- ✓ "action": Control the level of the relay matched by the "mask", whether it is on or off is related to the type of relay control.

3.8 Bulletin area management

3.8.1 createBulletin

✓ *Command sample:*

```
{
    "name": "createBulletin"
    "input": {
        "name":"bulletin0",
        "xcoord": "0",
        "ycoord":"0",
        "width":"400",
        "height":"32",
        "order":"0",
        "transparency":"100",
        "layoutMode":"Top",
        "bgColor":"0xFF00FF00",
        "fontName":"SimSun",
        "fontSize":"24",
        "fontColor":"0xFFFF0000",
        "fontAttributes":"normal",
        "stuntType":"5",
        "stuntSpeed":"16",
        "stayTime":"0",
        "startDate":"",
        "stopDate":"",
        "startTime":"",
        "stopTime":"",
        "content":"Base64-encoded bulletin display content"
    }
}
```

Parameter instruction:

- ✓ "order": bulletin serial number, tentatively 0～99
- ✓ "name": name of self-Define announcement
- ✓ "layoutMode": Announcement layout mode, 'top' /0-top, 'bottom' /1-bottom, 'custom' /2-self Define
- ✓ "xCoord": Since the Define layout mode is valid, the x coordinate of the upper left corner of Define
- ✓ "yCoord": Since the Define layout mode is valid, the y coordinate of the upper left corner of Define
- ✓ "width": Effective since the Define layout mode, the width of the Define area
- ✓ "height": Effective since the Define layout mode, the height of the Define area
- ✓ "transparency": the overall transparency of the region, ranging from 0 to 100, the default 100 is completely opaque
- ✓ "startDate": Play start date, format of year, month and day:' yyyy-MM-dd'
- ✓ "startTime": Play start time, format of hour, minute and second:' hh:mm:ss'
- ✓ "stopDate": End date of playback, format of year, month and day:' yyyy-MM-dd'

- ✓ "stopTime": End time of playback, in hour, minute, and second format:' hh:mm:ss'
- ✓ "weekFlag": Valid attributes for the week: the 1st to 7th digits represent Monday to Sunday respectively, for example: '1' means to play on Monday only, '127' means to play on Monday to Sunday
- ✓ "bgColor": The background color of the area in "0xAARRGGBB" format, the default is '0xFF000000' -opaque black
- ✓ "fontName": Font name, default Song Ti-"SimSun"
- ✓ "fontSize": font size, together with "fontSizeType" to determine the actual size of the font
- ✓ "fontSizeType": font size unit, 'pixel' /0 is in pixels (default), 'point' /1 is in points
- ✓ "fongColor": The font color of "0xAARRGGBB" format, the default is '0xFFFFFFFF'-opaque white
- ✓ "fontAttributes": Additional font attributes, including five types of 'bold' ,' italic' ,' normal' ,' underline' , ' strikeout' , etc.; can be combined with '&' , for example:' bold& italic& underline'
- ✓ "fontAlignment": text alignment (not implemented)
- ✓ "stuntType": the serial number of the partition stunt type
- ✓ "stuntSpeed": Partition stunt speed grade, ranging from 1 to 16, with 1 being the fastest
- ✓ "stayTime": The stay time of zone special effects, in seconds (Tentative)
- ✓ "content": text content

3.8.2 playBulletin

✓ *Command sample:*

```
{
    "name": "playBulletin"
}
```

3.8.3 deleteBulletin

✓ *Command sample:*

```
{
    "name": "deleteBulletin"
    "input": {
        "items": ["0","1","8"]
    }
}
```

Bulletin deletion is matched based on the bulletin sequence number "order". This instruction deletes bulletin listed in "items". When "items" is ["*"], delete all bulletin.

3.8.4 stopBulletin

✓ *Command sample:*

```
{
    "name": "stopBulletin"
}
```

Temporarily stop all bulletin, and the bulletin will be played again when the controller restarts.

3.8.5 queryBulletin

✓ *Command sample:*

```
{
    "name": "queryBulletin"
}
```

✓ *Reply sample:*

```
{
    "name": "queryBulletin",
    "output": {
        "0":"bulletin1",
        "1":"bulletin1"
    }
}
```

Return all current announcement serial numbers and announcement names ("Announcement Serial Number": "Announcement Name"). If there is no announcement, the response format is:

```
{
"name": "queryBulletin"
}
```

3.8.6 addVoice

✓ *Command sample:*

```
{
    "remotefunction": {
    "name": "addVoice"
        "input": {
            "text":"voice test",
            "gender":"0",
            "speed":"50",
            "tone":"50",
            "volume":"50",
            "number":"0",
            "one":"0",
            "basespeed":"1",
            "effect":"0",
            "silent":"1",
            "loop":"1"
         }
    }
}
```

Parameter instruction:

✓ "text": UTF-8 encoded text information

✓ "gender": Gender: "0" / "female", female voice; "1 / "male", male voice; default 0 female voice

✓ "speed": Speech speed: 1~100, the larger the speech speed, the faster; the default is 50

✓ "tone": intonation: 1~100, the larger the tone, the higher the intonation; the default is 50)

- ✓ "volume": Volume: 1~100, the larger the volume, the faster the volume; the default is 50)
- ✓ "number": Number pronunciation: 0~3; 0 numeric value first, 1 complete numeric value, 2 complete character string, 3 character string first; default numeric value first
- ✓ "one": Chinese pronunciation of character 1: "0" is pronounced as yao, and "1" is pronounced as yi; the default is "0"
- ✓ "basespeed": base speed of speech enhancement: 1 normal, 2 double speed, 4 quadruple speed; default 1
- ✓ "effect": sound effect: 0 none, 1 suddenly far and near, 2 echo, 3 robot, 4 chorus, 5 underwater, 6 reverberation, 7 yin and yang weirdness; default 0
- ✓ "silent": the silent time after each broadcast, 1~60, in seconds; the default is 1
- ✓ "loop": the number of looping broadcasts, 0~100; when it is 0, it means: if this information is the last piece of information in the list, it needs to be played in a loop until the new information arrives; the default is 1
- ✓

Additional information:

- ✓ Not all the voice functions of the control card are activated. Only specific models of controllers support voice synthesis. Please consult the technical staff for details.

3.9 Dynamic area management

The dynamic area program is temporarily stored in the memory, not stored in the local medium, and will not be saved after power failure. The dynamic distinction can be played independently as a global program, or it can be played in association with ordinary programs. The dynamic area is always displayed on the upper layer of all programs and does not affect the playback of other programs. You can take into account other programs by setting the transparency of the dynamic area.

- ✓ *As a global program (unlinked program), the dynamic area will play immediately*
- ✓ *When the associated program is played, the playing timeliness of the dynamic area will depend on or subordinate to the associated program.*
- ✓ *Timeliness of dynamic zone: The dynamic zone of unlinked programs is the global dynamic zone, and the timeliness is always effective. The timeliness of the dynamic area of the associated program is based on the timeliness of the associated program. Only the dynamic zone within the time limit can be played.*
- ✓ *If the dynamic area file is saved, the controller will automatically play the saved dynamic area according to the association relationship and timeliness after restarting the controller.*
- ✓ *Dynamic zone program playback uses the "dynamic zone update" command, while stopping the dynamic zone uses the "clear dynamic zone" command.*

3.9.1 updateDynamic

- ✓ *Command sample:*

```
{
    "name": "UpdateDynamic",
    "input": {
        "immediatelyPlay":"0",
        "cover":"0",
        "dynamics":[ {
            "id":"0",
            "xCoord": "200",
            "yCoord":"500",
            "width":"400",
            "height":"400",
            "transparency":"100",
            "relativeProgram":"",
            "runMode":"0",
            "updateFrequency":""
            "unit":[{
                "type":"Picture",
                "order":"0",
                "stuntType":"1",
                "stuntSpeed":"1",
                "stayTime":"5",
                "content":"Qk2mZAAA...",
                "flexible":"local",
                "gifFlag":"0"
            },{
                "type":"Text",
                "order":"1",
```

```
                "stuntType":"1",
                "stuntSpeed":"1",
                "stayTime":"5",
                "content":"5paH5a2X",
                "bgColor":"0xFF00FF00",
                "fontSize":"16",
                "fontName":"SimSun",
                "fontSizeType":"0",
                "fontColor":"0xFFFF0000",
                "alignment":"0"
            }, {
                "type":"URLPicture",
                "order":"3",
                "stuntType":"1",
                "stuntSpeed":"1",
                "stayTime":"5",
                "content":"ZnRwOi...",
                "gifFlag":"0"
            }, {
                "type":"URLText",
                "order":"4",
                "stuntType":"1",
                "stuntSpeed":"1",
                "stayTime":"5",
                "content":"ZnRw...",
                "bgColor":"0xFF00FF00",
                "fontSize":"16",
                "fontName":"SimSun",
                "fontSizeType":"0",
                "fontColor":"0xFFFF0000",
                "fontAttributes":"normal",
                "alignment-H":"0",
                "alignment-V":"0"
            }]
        }]
    }
}
```

This instruction is used to play a new dynamic area and update the dynamic area that is already being played. When the dynamic area is updated, the dynamic area will be rescheduled, and the dynamic area that is not in the update command will not be affected. You can send multiple dynamic zones at once, or only one dynamic zone. When the "type" type is "Picture" with a large number of units ("unit"), it is recommended to send in a single dynamic area to avoid packet loss caused by too large communication body. When the resource type is "Video", "URLPicture", or "URLText", it takes time to download the resource, and the playback of the resource will be delayed to varying degrees depending on the actual network conditions.

- ✓ "immediatelyPlay": You can specify a dynamic zone ID associated with a common program (must be the id existing in the dynamics parameter), and let the dynamic zone try to play immediately. If the running mode of the dynamic zone "runMode" is 0 or 1 or 2, the program priority of the dynamic zone is the highest and will be played immediately; if the "runMode" is 3 or 4 or 5, the dynamic zone will take the associated one The program priority of the ordinary program, and try to play it together with the associated ordinary program (when a higher priority ordinary program is playing, the reply fails); if the "runMode" is 6, the dynamic area

will take the associated The program priority of ordinary programs, and participates in scheduling as ordinary programs. Only one id can be specified. When it is Empty(""), it means that no ordinary program is associated.

- ✓ "cover": Whether to cover common programs, that is, whether to play only dynamic areas, "0": dynamic areas and common programs coexist and play, "1": stop playing common programs, and only play dynamic areas.
- ✓ "dynamic": The configuration list of various attributes of the dynamic zone.
- ✓ "unit": The attribute configuration list of all types of units in the dynamic. The number of units in the unit is 1~10, and it cannot be Empty.

The parameter descriptions in the "dynamics" and "unit" lists are shown in the table below, and the parameter types are all "string".

Attributes		Instruction
dynamics	xCoord	X coordinate
	yCoord	y coordinate
	width	Width, can not exceed the set screen size
	height	Height, can not exceed the set screen size
	transparency	transparency（0-100）
	id	Dynamic zone ID number, range 0~31 (support up to 32 dynamic zones)
	relativeProgram	The associated program, that is, the sequence number of the program to be associated (the order field ("0", "1",...) in the program list)). When it is Empty, there is no associated program, and the dynamic area is a global program. If the associated ordinary program does not exist, or the associated ordinary program is invalid, the dynamic area is processed as a global program.
	runMode	Dynamic zone operation mode: "0": Global play dynamic area, all units are displayed in a loop "1": Global dynamic zone program, all units are displayed in sequence, and stop playing the dynamic zone program after displaying once "2": Global dynamic zone program, all units are displayed in order, and the last unit in the dynamic zone will be statically displayed after the display is completed (in the order of unit order) "3": Bind the dynamic area to play, the dynamic area will be played when the associated program starts to play, all units are displayed in order in order, until the associated program is played. "4": Bind the dynamic area to play, the dynamic area is played when the associated program starts to play, all units are displayed in sequence, and will not be displayed in this round after the display is completed "5": Bind the dynamic area to play, the dynamic area is played when the associated program starts to play, all units are displayed in sequence, and the last unit of the dynamic area is displayed statically after the display is completed. "6": Interstitial dynamic area, the dynamic area will be played after the associated program is played, all units will be displayed in sequence and no longer displayed in this round, and the program after the associated program will continue to be played Notice: Ⅰ: When not associated with any common program, this field can only be 0, 1, 2; when specifying associated programs, this field can only be 3, 4, 5, 6, and the value beyond the boundary is invalid Ⅱ: The operating modes of 3, 4, 5, and 6 are used for the play

			mode of the dynamic area when the dynamic area is associated with ordinary programs, and the dynamic area participates in the carousel of the associated programs
	updateFrequency		URLPicture or URLText type resource download and update frequency, in seconds. Less than 5s are treated as 5s. Empty or 0, only download once
	unit	type	Types of units ("unit") in the dynamic area: "Picture/0": Picture stream "Text/1": text "URLPicture/3": Internet picture "URLText/4": Internet text (txt)
		order	Play order, range 0~9 (support up to 10 units)
		stuntType	Special effect type: Special effects applicable to "Picture" and "URLPicture": Special effects applicable to "Text" and "URLText":
		stuntSpeed	Stunt Speed（1-16）
		stayTime	Stay Time（s）
		content	Play content: 1. When the type is "URLPicture/3" or "URLText/4", the field is the base64 encoding of the standard URL; when the type is URLText, the keyList field is not Empty and is expanded to JSON format resources 2. When the type is "Picture/0" or "Text/1", the field is the base64 encoding of the picture stream or text by default; 3. When the type is "Picture/0", pass "flexible"="local", this field is the base64 encoding of the path of the local picture file 4. When the type is "Text/1", pass "flexible"="countdown", the actual content of this field countdown base,See Appendix9
		flexible	When the dynamic area type is "Picture/0" or "Text/1", this parameter is used to identify the source of the material or expand the function. "Local": local material. "Countdown": Countdown area (only "Text/1" type is supported).
		keyList	Element index in Base64 encoding format.See Appendix8 It is valid when the type is "URLText" and the network resource is json format data.
		gifFlag	Logo of GIF type picture: "0": non-GIF type "1": GIF type (does not support dynamic playback for the time being, only for normal picture playback)
		bgColor	Background color (ARGB), valid when the type is "Text" and "URLText" For example, black: 0xFF000000
		fontSize	Font size, valid when the type is "Text" and "URLText"
		fontSizeType	Specify whether the font size is in pixels or points:"0"： pixel "1"： point
		fontName	Font name, valid when the type is "Text" and "URLText"
		fontColor	Font color (ARGB), valid when the type is "Text" and "URLText" For example, red: 0xFFFF0000
		fontAttributes	Including "bold", "italic", "normal", where "bold" and "italic" can be combined by "&"

		alignment-H	Horizontal alignment, valid when the type is "Text" and "URLText": "top/0": top "bottom/1": bottom "center/2": centered
		alignment-V	Vertical alignment, valid when the type is "Text" and "URLText": "top/0": top "bottom/1": bottom "center/2": centered
		volume	Video playback volume (0-100)
		scaleMode	Zoom mode, including window ratio "Window", original ratio "Original"
		rotationMode	Counterclockwise rotation angle, including 0 degree, 90 degree, 180 degree, 270 degree
		signature	BASE64 encoding for digital signature of abstract content
		digest	Summary algorithm: "sha1", "md5", the default is "sha1"
		offset	The start position offset of the summary content, the default is "0"
		length	The length of the abstract content to be intercepted. The default is the length after "offset". The length range is greater than (inclusive) 1MB and less than (inclusive) 8MB. If the file (stream) is less than 1MB, take the full file (stream) length.
		fingerprint	Signature certificate fingerprint in SHA1 format

Additional instruction:：

The parameters "signature", "digest", "offset", "length", and "fingerprint" are used to authenticate program files or program streams in the dynamic area after the File authentication switch is turned on (except for local materials). After file authentication is turned on, only "Picture" and "Text" types are supported, and "URLPicture" and "URLText" types are no longer supported.

3.9.2 updateDynamicUnits

✓ *Command sample:*

```
{
    "protocol":{
        "name": "YQ-COM2","version": "1.0",
        "remotefunction":{
            "name": "UpdateDynamicUnits",
            "input": {
                "dynamics": [{
                    "id": "0",
                    "order":"0",
                    "content":"409b24bb8fb7f03d76908852c9f105d0.bmp",
                    "signature": "Rd+f … ew==",
                    "digest": "sha1",
                    "offset": "0",
                    "length": "1024",
                    "fingerprint":"31:F2:17:E5:25:4D:61:EF:AF:4F:29:CF:56:2B:F5:
86:DC:DE:F2:65"
```

```
                },{"id": "1",
                   "order":"1",
                   "content":"0bb856e65ec7a08cc12a7d791c8be271.bmp",
                   "signature": "Rd+f … ew==",
                   "digest": "sha1",
                   "offset": "0",
                   "length": "1024",
                   "fingerprint":"31:F2:17:E5:25:4D:61:EF:AF:4F:29:CF:56:2B:F5:
86:DC:DE:F2:65"
                },{"id": "2",
                   "order":"0",
                   "content":"c2hhcmUvN2VlZGY0OTA0ZGY3OGM2NjQzZWMzMDA2ZTJmZTc1Y
mYuYm1w ",
                   "flexible":"local"
                }]
            }
        }
    }
}
```

This command is used to update the material of the existing dynamic area unit. For the time being, only "Picture/0" and "Text/1" type dynamic areas are supported. When using this command, make sure that only the material changes in the dynamic area of the updated material, and all other attributes are unchanged, otherwise it may cause an unknown exception in the dynamic area.

- ✓ "dynamics": The list of dynamic zones that need to be updated. The dynamic area ID and unit order must already exist, and the type is "Picture/0" or "Text/1".
- ✓ "id": Dynamic area ID.
- ✓ "order": The order of the unit must correspond to the order of the unit in the "update dynamic area" command.
- ✓ "content":
- ✓ File stream: When the file content is included in a normal POST request, this item is base64-encoded for the file content.
- ✓ Local file: When the update material is a local file, this item is the base64 encoding of the local material path, and the "flexible" parameter needs to be passed.
- ✓ "flexible":

When the dynamic area type is "Picture", this parameter is used to identify the source of the material. Non-local materials can ignore this parameter.upload the material in advance according to the File upload process

- ✓ "local": Local material.
- ✓ "countdown": countdown area (only "Text/1" type is supported)

After open the File authentication switch， The command needs to include the following parameters for file or stream authentication (except for local materials):

- ✓ "signature": BASE64 encoding for digital signature of abstract content
- ✓ "digest": Digest algorithm: "sha1", "md5", the default is "sha1"
- ✓ "offset": the offset of the starting position of the summary content, the default is "0"
- ✓ "length": The length of the summary content interception, the default is the length after "offset". The length range is greater than (inclusive) 1MB and less than (inclusive) 8MB. If the file (stream) is less than 1MB, take the full file (stream) length.
- ✓ "fingerprint": The fingerprint of the signature certificate in SHA1 format

3.9.3 clearDynamic

✓ *Command sample:*

```
{
    "name": "clearDynamic",
    "input": {
        "id":["0","1"]
    }
}
```

Clear the dynamic area being played, that is, stop the playback of the dynamic area and delete the dynamic area (the saved dynamic area file will not be deleted).

✓ "Id": The ID number of the dynamic area to be cleared, which is ["*"] to clear all.

3.9.4 saveDynamicFile

✓ *Command sample:*

```
{
    "name": "SaveDynamicFile",
    "input": {
        "id":["0","1"]
    }
}
```

✓ This command can be saved in the dynamic area file that is broadcast, and the saved dynamic area program will be played again when the controller restarts. For the "URLPicture" and "URLText" types of dynamic areas, the material is not saved, only the URL of the material is saved, and the corresponding material needs to be downloaded again when the dynamic area is played after the controller is restarted.

✓ "id": The ID number of the dynamic area that needs to be saved is ["*"] to save all the live dynamic areas.

3.9.5 deleteDynamicFile

✓ *Command sample:*

```
{
    "name": "DeleteDynamicFile",
    "input": {
        "id":["0","1"]
    }
}
```

This command deletes the saved dynamic area file (save with the "SaveDynamicFile" command), and the dynamic area will not play again after restarting the controller. Does not affect the dynamic zone program being broadcast.

✓ "id": The ID of the saved dynamic area that needs to be deleted, which is ["*"] to delete all the saved dynamic areas.

3.9.6 countDown

✓ *Command sample:*

```
{
    "name": "countDown",
    "input": {
        "dynamics": [{
            "id": "0",
            "order": "0",
            "status":"on"
        },{
            "id": "1",
            "order": "0",
            "status":"off"
        }]
    }
}
```

This command is used to enable and pause the countdown function of the "Text/1" type dynamic zone.Countdown base issued via Update play dynamic areaor Update dynamic area material

- ✓ "dynamics": list of dynamic zones. The dynamic area id and unit order must already exist and the type is "Text/1".
- ✓ "id": Dynamic area ID.
- ✓ "order": dynamic area unit order.
- ✓ "status": countdown switch status. "On": start the countdown, "off": pause the countdown.

✓ *Reply sample:*

```
{
    "remotefunction": {
        "name": "countDown",
        "output": {
            "dynamics": [{
                "id": "0",
                "order": "0",
                "clock": "56049",
                "status":"on"
            },{"id": "1",
                "order": "0",
                "clock": "10031",
                "status":"off"
            }]
        }
    }
}
```

- ✓ "dynamics": list of dynamic zones.
- ✓ "id": Dynamic area ID.
- ✓ "order": dynamic area unit order.
- ✓ "clock": Countdown pause value, in ms.
- ✓ "status": countdown switch status. "On": start the countdown, "off": pause the countdown.

3.10 others

3.10.1 setLedFlag

✓ *Command sample:*

```
{
    "name": "setLedFlag"
    "input": {
        "ledflag": "off"
    }
}
```

Mainly used in debugging screens, the word "LED" can be displayed in the middle of the four corners of the screen.Parameter instruction:

✓ "ledflag": "on" or 1 - display, "off" or 0 - not display

3.10.2 setLogo

✓ *Command sample:*

```
{
    "name": "setLedFlag",
    "input": {
        "logoflag": "on",
        "filepath": "share/123.bon",
        "logopos": "center"
    }
}
```

For the time being, only BX-Y5E supports this command, and other models have not implemented it.

Parameter instruction:

✓ "logoflag": "on"/"1"-use the self-define boot screen, "off"/"0"-use the factory boot screen; if you need to disable the boot screen, please send a black picture

✓ "filepath": Logo image path of the startup screen

✓ "logopos": "fullscreen", full screen, scaled according to the screen size; "center", centered, keeping the picture ratio; "topleft", placed in the upper left corner, the picture is only scaled, not keeping the picture ratio.

3.10.3 screenCapture

✓ *Command sample:*

```
{
    "name":"ScreenCapture",
    "input": {
        "suffix": "jpg",
        "framecount": "5",
        "picwidth": "800",
        "picheight": "600"
    }
```

```
}
```

Parameter instruction:

- ✓ "suffix": The file type to save the screenshot, png-single image capture or gif-animation capture (time-consuming)
- ✓ "picwidth": the width of the picture after interception
- ✓ "picheight": The height of the captured image, if the width and height are different from the screen width and height, it will be stretched or reduced
- ✓ "framecount": the number of frames to be intercepted, the maximum is 15 frames, valid when "suffix" is gif

✓ *Reply sample:*

```
{
    "name": "screenCapture",
    "output": {
        "filepath": "share/screen.jpg",
        "maxwaittime": "10",
        "minwaittime": "5"
    }
}
```

"Screen capture" is a non-real-time command, and you need to inform the host computer how long it will take to query (through the "query file information" command) the execution result.

- ✓ "minwaittime": The minimum time required to wait for the processing of non-real-time commands, in seconds
- ✓ "maxwaittime": The maximum time required to wait for the processing of non-real-time commands, in seconds
- ✓ "filepath": After the interception is successful, the file path and file name will be saved in the subsequent "query file information"

After receiving the reply, the host computer will issue the "query file information" according to the minimum/maximum waiting time to determine whether the screenshot is completed; after the confirmation is completed, the result can be obtained through the "download file from the control card" command.

3.10.4 gpsSpeedControl

✓ *Command sample:*

```
{
    "name": "gpsSpeedControl",
    "input": {
        "gpscontrol": "screenstatus",
        "gpsthresholdupper": "80",
        "gpsthresholdlower": "80"
    }
}
```

Parameter instruction:

- ✓ "gpscontrol": control type enable flag.
  - ✓ "off": Turn off GPS control function.
  - ✓ "screenstatus": Turn on and off the GPS speed control screen. For the time being, only the screen switch is supported.
- ✓ "gpsthresholdupper": The upper threshold of the status change.

  When the value of "gpscontrol" is "screenstatus": "gpsthresholdupper" is the off-screen threshold, in km/h. When the instantaneous speed acquired by GPS is higher than this threshold, the screen will be turned off immediately

✓ "gpsthresholdlower": The lower threshold of the status change.

When the value of "gpscontrol" is "screenstatus": "gpsthresholdlower" is the screen opening threshold, in km/h. When the speed acquired by GPS within 30 seconds is below this threshold, the screen turns on.

Note: The function has not been considered and perfect, you can try it
The value of the parameter "gpsthresholdupper" must be greater than or equal to "gpsthresholdlower".
To replace the threshold, the control must be turned off first.

3.10.5 LOCK/UNLOCK SCREEN - lockScreen

✓ *Command sample:*

```
{
    "name": "lockScreen",
    "input": {
        "screenlockedstatus": "on"
    }
}
```

Parameter instruction:

✓ "screenlockedstatus": "on"或 1 - LOCK, "off" or 0 - UNLOCK

3.10.6 databaseQuery

✓ *Command sample:*

```
{
    "name": "databaseQuery",
    "input": {
        "host": "192.168.8.173",
        "port": "1433",
        "user": "sa",
        "pass": "ODg4ODg4",
        "dbtype": "sqlserver",
        "dbname": "",
        "querycmd": "select [ID] AS 'ID',[name] AS 'Name',[age] AS 'Age', \
           [sex] AS 'Sex' from table_A"
    }
}
```

Parameter instruction:

✓ "host": the domain name or IP of the database server host
✓ "port": database server host port
✓ "user": the user name for accessing the database server
✓ "pass": base64 encoded value of the database server access password
✓ "dbtype": database type "sqlserver" or "mysql"
✓ "dbname": Used to specify the database name when "dbtype" is "mysql"
✓ "querycmd": database query command, pay attention to the differences in commands of different database types; the control card uses the original sentence of this parameter to try to query without any modification.

✓ *Reply sample:*

```
{
    "name": "databaseQuery",
    "output": {
       "totalRows" : 3,
       "totalColumns" : 4,
       "filed": ["ID", "Name", "Age", "Sex"],
       "data" : [
          ["002", "Tom", "12", "boy"],
          ["003", "Jerry", "12", "boy"],
          ["005", "Mairy", "11", "girl"]
       ]
    }
}
```

Parameter instruction:

- ✓ "totalRows": returns the total number of data in the database query result, if more than 10, only 10 is returned
- ✓ "totalColumns": returns the total number of columns of database query results
- ✓ "field": Return each Field name of the database query result in the form of a one-dimensional array (or an alias determined by the command)
- ✓ "data": Returns the database query result in the form of a two-dimensional array

✓ *Error sample：*

```
{
    "name": "databaseQuery",
    "error": {
        "code": "Error",
        "mesg": "具体 Error Description"
    }
}
```

See Appendix2：Error list

3.10.7 updateGpioMode

✓ *Command sample:*

```
{
    "name": "updateGpioMode",
    "input": {
       "mode": "0"
    }
}
```

Parameter instruction:

- ✓ "mode": 0/off-off; 1/discrete-single control; 2/combined-combined control (natural code); 3/gray-combined control (Gray code)

Note: The on-time must be maintained at 200ms to trigger the program switching; after the program is switched, it is in the protection time within 3 seconds and will not be switched; this command has a protection time of 5 seconds and cannot be issued again.

Single control truth table (- on, o off, x don't care):

IN3	IN2	IN1	IN0	节目 order
x	x	x	-	0

x	x	-	o	1
x	-	o	o	2
-	o	o	o	3
o	o	o	o	Loop

Natural code combination control（- on, o off）:

IN3	IN2	IN1	IN0	Program order
o	o	o	o	0
o	o	o	-	1
o	o	-	o	2
o	o	-	-	3
o	-	o	o	4
o	-	o	-	5
o	-	-	o	6
o	-	-	-	7
-	o	o	o	8
-	o	o	-	9
-	o	-	o	10
-	o	-	-	11
-	-	o	o	12
-	-	o	-	13
-	-	-	o	14
-	-	-	-	15

Gray code (typical) combination control（ - on, o off）:

IN3	IN2	IN1	IN0	节目 order
o	o	o	o	0
o	o	o	-	1
o	o	-	-	2
o	o	-	o	3
o	-	-	o	4
o	-	-	-	5
o	-	o	-	6
o	-	o	o	7
-	-	o	o	8
-	-	o	-	9
-	-	-	o	10
-	-	-	o	11
-	o	-	o	12
-	o	-	-	13
-	o	o	-	14
-	o	o	o	15

3.10.8 addCertificate

✓ *Command sample*

```
{
    "name": "addCertificate",
    "input": {
        "filename": "share/name.pem",
        "type": "0",
        "signature": "Rd+f … ew==",
```

```
        "fingerprint":"31:F2:17:E5:25:4D:61:EF:AF:4F:29:CF:56:2B:F5:86:DC:DE:F2:
65"
    }
}
```

This command is used to add a certificate for TLS encryption mode or file signature authentication. The carried signature is the result of digital signature using the private key corresponding to the certificate to be added.

Parameter instruction:

- ✓ "filename": Path of certificate file in PEM format。The file pass the "File upload process"transmit to the controller in advance.
- ✓ "type": Certificate applicable type, the value is "0" or "1". When it is "0", it indicates a communication encryption certificate, and when it is "1", it indicates a certificate for file signature authentication.
- ✓ "signature": Take "ADDCERTIFICATE" as the digest, adopt the "sha1" algorithm, and use the private key corresponding to the certificate to perform the BASE64 encoding of the digital signature result
- ✓ "fingerprint": The fingerprint of the certificate to be added in SHA1 format

3.10.9 deleteCertificate

✓ *Command sample:*

```
{
    "name": "deleteCertificate",
    "input": {
        "type": "0",
        "signature": "Rd+f … ew==",
        "fingerprint":"31:F2:17:E5:25:4D:61:EF:AF:4F:29:CF:56:2B:F5:86:DC:DE:F2:
65"
    }
}
```

This command is used to delete the certificate. The carried signature is the result of digital signature using the private key corresponding to the certificate to be deleted.

Parameter instruction:

- ✓ "type": Certificate applicable type, the value is "0" or "1". When it is "0", it indicates a communication encryption certificate, and when it is "1", it indicates a certificate for file signature authentication.
- ✓ "signature": Take "DELETECERTIFICATE" as the digest, adopt the "sha1" algorithm, and use the private key corresponding to the certificate to be deleted to perform the BASE64 encoding of the digital signature result
- ✓ "fingerprint": The fingerprint of the certificate to be deleted in SHA1 format

3.10.10 playAudio

✓ *Command sample:*

```
{
    "name": "playAudio",
    "input": {
        "items":[
            {"filepath":"share/num1.mp3","volume":"100","silent":"1"},
            {"filepath":"share/num2.mp3","volume":"100","silent":"1"},
            {"filepath":"share/num3.mp3","volume":"100","silent":"1"}
        ],
        "loop":"0"
    }
}
```

Parameter instruction:

- ✓ "items": List of audio files to be played. If "items" is ["*"], stop playing all audio files.
- ✓ "filepath": Audio file path. The audio files are uploaded to the controller in advance, it is recommended to use the "share" directory.
- ✓ "volume": Volume value. The default is 100.
- ✓ "silent": Silent time after the current audio is played, in seconds. The default is 0.
- ✓ "loop": The number of times of play. The playback sequence follows the audio list of "items". Loop when it is "0". When it is greater than "0", it represents the actual number of times of play. The default is "1".

3.10.11 File authentication switch - fileVerifySwitch

✓ *Command sample:*

```
{
    "name": "fileVerifySwitch",
    "input": {
        "authenticationswitch": "on",
        "signature": "Rd+f … ew==",
        "fingerprint":"31:F2:17:E5:25:4D:61:EF:AF:4F:29:CF:56:2B:F5:86:DC:DE:F2:
65"
    }
}
```

This command is used to enable and disable the file authentication function. The instruction needs to carry a digital signature，add the certificate in advance via command Add TLS certification

Parameter instruction:

- ✓ "authenticationswitch": File authentication switch. "on": turn on the document authentication function, "off": turn off the document authentication function
- ✓ "signature": Take "FILEVERIFYSWITCH" as the digest, adopt the "sha1" algorithm, and use the private key corresponding to the certificate specified by "fingerprint" to perform the BASE64 encoding of the digital signature result
- ✓ "fingerprint": The fingerprint of the signature certificate in SHA1 format

3.10.12 queryRcard

✓ *Command sample:*

```
{
    "name": "queryRcard",
    "input": {
        "items": ["number"]
    }
}
```

Parameter instruction:

✓ "items": The list of receiving card information that needs to be queried. "number": The number of receiving cards. Currently only "number" query is supported.

✓ *Reply sample:*

```
{
    "output": {
    "number": {
        "1": "1",
        "2": "0",
        "3": "0",
        "4": "0"
    }
}
```

Parameter instruction:

✓ "number": List of the receiving cards quantity. "1", "2", "3", "4" indicate the controller interface, and its value indicates the quantity of receiving cards in current interface.

3.10.13 setSerial

✓ *Command sample:*

```
{
    "name": "setserial",
    "input": {
        "serialproperty": "s2,4800,1000,"
    }
}
```

This command is used to set the serial port related parameters and start the serial port communication service.

Parameter instruction:

All serial port mode related parameters are in the form of strings, separated by "," and written into the property "serialproperty" in order. The property must contain all parameters, and the unused parameters are assigned Empty to show the placeholder. The order of the parameters is in accordance with the following instructions.

1. Serial communication working mode
   - ✓ "off": Turn off the serial communication mode
   - ✓ "s1": Serial port protocol 1 mode, simple mode, See "Asynchronous full-color serial port communication protocol"
   - ✓ "s2": Serial port protocol 2 mode, BPCL customized
   - ✓ "s3": Serial port protocol 3 mode, modbus

2. Baud rate, such as 9600, 115200, unit bps
3. Timeout time, unit ms
4. Slave device number, used in "s3" mode

3.10.14 Controller diagnostic command set – diagnosis

Controller debugging commands are a series of commands for diagnosing controller problems open to R&D internal personnel. The command name is "diagnosis", and the specific function commands are designated by "command". The real-time reply content is in BASE-64 encoding format.

3.10.14.1 Check system time

✓ *Command sample:*

```
{
    "name": "diagnosis",
    "input": {
        "command": "date"
    }
}
```

This sub-command is used to view the current system time of the controller and call the system command "date".

Parameter instruction:

✓ "command": The name of the system command to be called.

✓ *Reply sample:*

```
{
    "command":"date",
    "result":"VHVlIEp1bCAgMyAxMToyMjoyOSBDU1QgMjAxOA=="
}
```

3.10.14.2 Check hardware time

✓ *Command sample:*

```
{
    "name": "diagnosis",
    "input": {
        "command": "hwclock",
    }
}
```

This sub-command is used to view the hardware time of the controller and call the system command "hwclock".

Parameter instruction:

✓ "command": The name of the system command to be called.

✓ *Reply sample:*

```
{
    "name": "diagnosis",
    "output": {
        "command":"hwclock",
        "result":"VHVlIEp1bCAgMyAxMzowMDozMiAyMDE4ICAwLjAwMDAwMCBzZWNvbmRz"
    }
```

```
}
```

3.10.14.3 Check file directory list

✓ *Command sample:*

```
{
    "name": "diagnosis",
    "input": {
        "command": "ls",
        "arguments": {
            "path": "/log"
        }
    }
}
```

This subcommand is used to view the file directory list and call the system command "ls -l <path>".

Parameter instruction:

- ✓ "command": The name of the system command to be called.
- ✓ "arguments": The required parameters of the system command name.
- ✓ "path": The directory path to be viewed, relative to the user directory.

✓ *Reply sample:*

```
{
    "name": "diagnosis",
    "output": {
        "command":"ls",
        "result":"LXJ3LXJ3LXJ3LSAgICAxIHJvb3QgICAgIHJvb3QgICAgICAgICAgI…"
    }
}
```

3.10.14.4 Check file content

✓ *Command sample:*

```
{
    "name": "diagnosis",
    "input": {
        "command": "cat",
        "arguments": {
            "file": "/log/playerLog"
        }
    }
}
```

This sub-command is used to view the content of the file and call the system command "cat <file>".

Parameter instruction:

- ✓ "command": The name of the system command to be called.
- ✓ "arguments": The required parameters of the system command name.
- ✓ "file": The path of the file to be viewed.

✓ *Reply sample:*

```
{
```

```
    "name": "diagnosis",
    "output": {
        "command":"cat",
        "result":"WzIwMTgtMDYtMDggMTc6MTY6MTFdWzMxMF1bTVBdW0lORk9dOiB…",
    }
}
```

The size of the returned file content is limited to 4k. Starting from the file header, omit the part that exceeds 4k. The complete content of the file can be viewed by downloading.

3.10.14.5 Check the beginning of the file

✓ *Command sample:*

```
{
    "name": "diagnosis",
    "input": {
        "command": "head",
        "arguments": {
            "file": "/log/playerLog",
            "lines": "10"
        }
    }
}
```

This sub-command is used to view the content of the specified number of lines at the beginning of the file, and call the system command "head -n <lines> <file>".

Parameter instruction:

- ✓ "command": The name of the system command to be called.
- ✓ "arguments": The required parameters of the system command name.
- ✓ "file": The path of the file to be viewed.
- ✓ "lines": The number of lines to be viewed.

✓ *Reply sample:*

```
{
    "name": "diagnosis",
    "output": {
        "command":"head",
            "result":"WzIwMTgtMDYtMDggMTc6MTY6MTFdWzMxMF1bTVBdW0lORk9dOiB…"
    }
}
```

The size of the returned file content is limited to 4k. Starting from the file header, omit the part that exceeds 4k. The complete content of the file can be viewed by downloading.

3.10.14.6 Check the end of the file content

✓ *Command sample:*

```
{
    "name": "diagnosis",
    "input": {
        "command": "tail",
        "arguments": {
            "file": "/log/playerLog",
```

```
            "lines": "10"
        }
    }
}
```

This sub-command is used to view the content of the specified number of lines at the end of the file, and call the system command "tail -n <lines> <file>".

Parameter instruction:

- ✓ "command": The name of the system command to be called.
- ✓ "arguments": The required parameters of the system command name.
- ✓ "file": The path of the file to be viewed.
- ✓ "lines": The number of lines to be viewed.

✓ *Reply sample:*

```
{
    "name": "diagnosis",
    "output": {
        "command":"tail",
        "result":"WzIwMTgtMDctMDQgMTA6MzM6MzRdWzM1MF1bTVBdW0lORk9dOiBb…"
    }
}
```

The size of the returned file content is limited to 4k. Starting from the end of the file, omit the part that exceeds 4k. The complete content of the file can be viewed by downloading.

3.10.14.7 Text content matching

✓ *Command sample:*

```
{
    "name": "diagnosis",
    "input": {
        "command": "grep",
        "arguments": {
            "file": "/log/playerLog",
            "patterns": ["P1","P2"]
        }
    }
}
```

This sub-command is used to find the text content that meets the specified regular expression, call the system command "grep -e <patterns[0]> -e <patterns[1]>… <file>".

Parameter instruction:

- ✓ "command": The name of the system command to be called.
- ✓ "arguments": The required parameters of the system command name.
- ✓ "file": The path of the file to be viewed.
- ✓ "patterns": a list of basic regular expressions, no more than 8.

✓ *Reply sample:*

```
{
    "name": "diagnosis",
```

```
    "output": {
        "command":"grep",
        "result":"WzIwMTgtMDctMDMgMTg6MTU6MzFdIFtVRFBdIFtFUlJPUiAgIF0…"
    }
}
```

3.10.14.8 Check system process

✓ *Command sample:*

```
{
    "name": "diagnosis",
    "input": {
        "command": "ps"
    }
}
```

This sub-command is used to view the running process of the system and call the system command "ps ax".

Parameter instruction:

✓ "command": The name of the system command to be called.

✓ *Reply sample:*

```
{
    "name": "diagnosis",
    "output": {
        "command":"ps",
        "result":"ICBQSUQgVFRZICAgICAgU1RBVCAgIFRJTUUgQ09NTUFORAogICA…"
    }
}
```

3.10.14.9 Check system storage

✓ *Command sample:*

```
{
    "name": "diagnosis",
    "input": {
         "command": "free"
    }
}
```

This sub-command is used to view the system memory usage and call the system command "free".

Parameter instruction:

✓ "command": The name of the system command to be called.

✓ *Reply sample:*

```
{
    "remotefunction": {
        "name": "diagnosis",
        "output": {
            "command":"free",
            "result":"ICAgICAgICAgICAgICB0b3RhbCAgICAgICAgdXNlZCAgICAgICAg…"
```

```
        }
    }
}
```

3.10.14.10 Stop the process

✓ *Command sample:*

```
{
    "name": "diagnosis",
    "input": {
        "command": "kill",
        "arguments": {
            "pid": ["160","170"],
            "force": "yes"
        }
    }
}
```

This sub-command is used to terminate the running process in the system and call the system command "kill [-9] <pid[0]> <pid[1]>". Use this command with caution.

Parameter instruction:

- ✓ "command": The name of the system command to be called.
- ✓ "arguments": The required parameters of the system command name.
- ✓ "pid": A list of process numbers that need to be terminated.
- ✓ "force": Whether to forcefully terminate the process ID. "Yes": Forcefully terminate the process, send the #9 (SIGKILL) signal; "no": Don't force the process to terminate, send the #15 (default SIGTERM) signal.

3.10.14.11 Check the network device

✓ *Command sample:*

```
{
    "name": "diagnosis",
    "input": {
        "command": "ifconfig"
    }
}
```

This sub-command is used to view the network device interface parameters and call the system command "ifconfig".

Parameter instruction:

- ✓ "command": The name of the system command to be called.

✓ *Reply sample:*

```
{
    "name": "diagnosis",
    "output": {
        "command":"ifconfig",
        "result":"ZXRoMCAgICAgIExpbmsgZW5jYXA6RXRoZXJuZXQgIEhXYWRkciAw…"
    }
```

```
}
```

3.10.14.12 Resolve hostname

✓ *Command sample:*

```
{
    "name": "diagnosis",
    "input": {
        "command": "resolveip",
        "arguments": {
            "host": "g.cn"
        }
    }
}
```

This sub-command is used to resolve the host name to an IP address and call the system command "resolveip <host>".

Parameter instruction:

- ✓ "command": The name of the system command to be called.
- ✓ "arguments": The required parameters of the system command name.
- ✓ "host": The host name to be resolved.

✓ *Reply sample:*

```
{
    "name": "diagnosis",
    "output": {
        "command":"resolveip",
        "result":"SVAgYWRkcmVzcyBvZiBnLmNuIGlzIDIwMy4yMDguNDAuOTU=…"
    }
}
```

Perhaps Error reply：

```
{
    "name": "diagnosis",
    "error": {
        "code": 26,
        "mesg": "UDP cmd transfer timeout.timed out"
    }
}
```

The command execution timed out, which generally means that there is a problem with the set domain name server.

3.10.14.13 Check the router list

✓ *Command sample:*

```
{
    "name": "diagnosis",
    "input": {
        "command": "route"
    }
}
```

This sub-command is used to view the routing table and call the system command "route -n".

Parameter instruction:

✓ "command": The name of the system command to be called.

✓ *Reply sample:*

```
{
    "name": "diagnosis",
    "output": {
        "command":"route",
        "result":"S2VybmVsIElQIHJvdXRpbmcgdGFibGUKRGVzdGluYXRpb24gICAg…"
    }
}
```

3.10.14.14 Check the network status

✓ *Command sample:*

```
{
    "name": "diagnosis",
    "input": {
        "command": "netstat"
    }
}
```

This sub-command is used to view the network connection status and related information, and call the system command "netstat -anp".

Parameter instruction:

✓ "command": The name of the system command to be called.

✓ *Reply sample:*

```
{
    "name": "diagnosis",
    "output": {
        "command":"netstat",
        "result":"QWN0aXZlIEludGVybmV0IGNvbm5lY3Rpb25zIChzZXJ2ZXJzIGFu…"
    }
}
```

3.10.14.15 Check the network connect

✓ *Command sample:*

```
{
    "name": "diagnosis",
    "input": {
        "command": "ping",
        "arguments": {
            "host": "g.cn",
        }
    }
}
```

This sub-command is used to check whether the network is connected to the host. Call the system command "ping -w4 <host>".

Parameter instruction:

- ✓ “command”：The name of the system command to be called.
  - ✓ "arguments": The required parameters of the system command name.
  - ✓ "host": The name of the host that needs to be connected.

✓ *Reply sample:*

```
{
    "name": "diagnosis",
    "output": {
        "command":"ping",
        "resultFile":"/share/ping_<time stamp>.rst",
        "minWaitTime": "4",
        "maxWaitTime": "6"
    }
}
```

This command is an asynchronous command. You need to use "findFile" after the minimum waiting time "minWaitTime" to try to query whether the "resultFile" exists. If the "resultFile" file is not queried after the maximum waiting time "maxWaitTime", the command execution can be considered as a failure .

Parameter instruction:

- ✓ "resultFile": The file path where the command execution result is stored. "<time stamp>" creates a time stamp for the file.
- ✓ "minWaitTime": The minimum waiting time required for querying asynchronous command results.
- ✓ "maxWaitTime": The maximum waiting time required for querying the results of asynchronous commands.

3.10.14.16 Router tracking

✓ *Command sample:*

```
{
    "name": "diagnosis",
    "input": {
        "command": "traceroute",
        "arguments": {
            "host": "g.cn"
        }
    }
}
```

This sub-command is used to track all paths (gateways or routes) of data packets transmitted on the network, and call the system command "traceroute -nl -m10 -q1 -w2 <host>".

Parameter instruction:

- ✓ “command”：The name of the system command to be called.
- ✓ “arguments”：the parameter of system command name
  - ✓ “host”：the host name to be tracked。

✓ *Reply sample:*

```
{
    "name": "diagnosis",
    "output": {
        "command":"traceroute",
        "resultFile":"/share/traceroute_<time stamp>.rst",
```

```
        "minWaitTime": "20",
        "maxWaitTime": "25"
    }
}
```

This command is an asynchronous reply command. It is necessary to try to query the contents of the "resultFile" file after the minimum waiting time "minWaitTime". If the "resultFile" file is not queried after the maximum waiting time "maxWaitTime", the command execution can be considered as a failure.

Parameter instruction:

- ✓ "resultFile": The file path where the command execution result is stored. "<time stamp>" creates a time stamp for the file.
- ✓ "minWaitTime": The minimum waiting time required for querying asynchronous command results.
- ✓ "maxWaitTime": The maximum waiting time required for querying the results of asynchronous commands.

3.10.14.17 Open the remote help

✓ *Command sample:*

```
{
    "name": "diagnosis"
    "input": {
        "command": "htran",
        "arguments": {
            "host": "222.66.141.10",
            "port": "16080"
        }
    }
}
```

This sub-command is used to turn on the remote login controller.

Parameter instruction:

- ✓ "command": The name of the system command to be called.
- ✓ "arguments": the parameter of system command name
  - ✓ "host": The IP address of the remote assistance host.
  - ✓ "port": The port of the remote assistance host.

✓ *Reply sample:*

```
{
    "name": "diagnosis",
    "output": {
        "command":"htran",
        "pid":"23567"
    }
}
```

The command is only temporarily turned on, and will become invalid after restarting. In addition, a remote assistance channel (server) needs to be built.

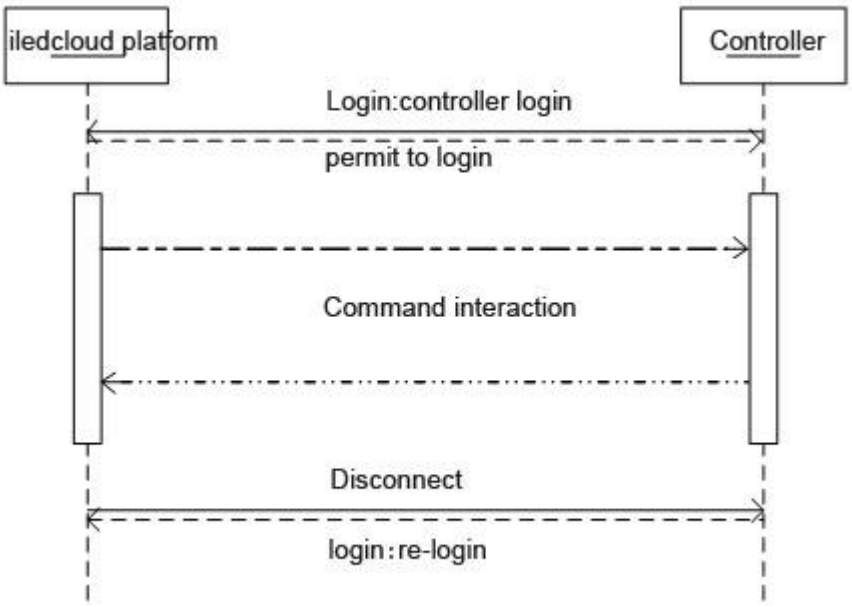
Parameter instruction:

- ✓ "pid": The process number of the agent program htran, which can be used for the "kill" sub-command.

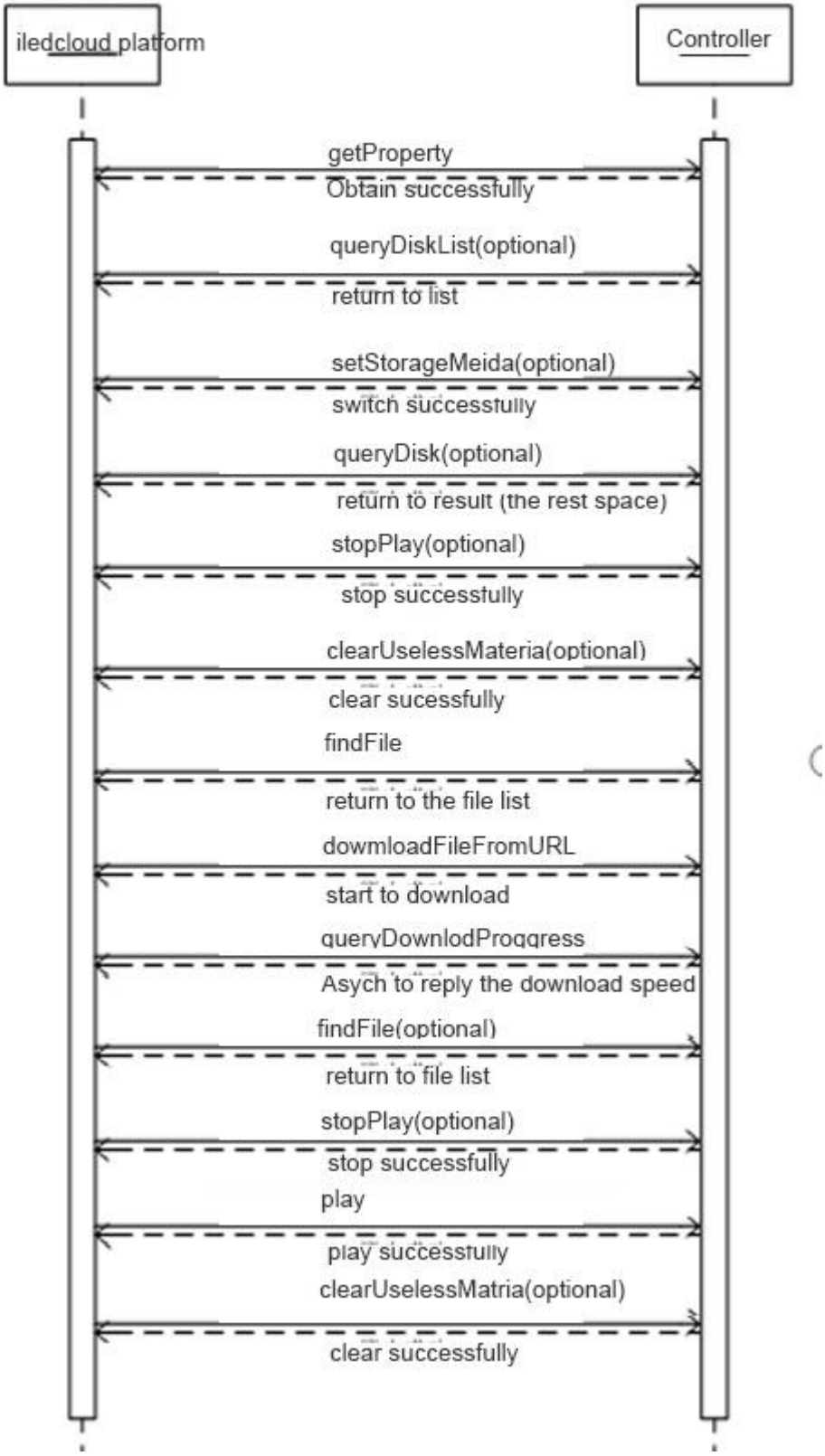
4. Cloud mode communication process

4.1 Login process

The control card needs to successfully log in to the cloud platform in order to normally take over the commands sent by the cloud platform, execute and reply. If the connection is accidentally disconnected, the control card will log in to the cloud platform again.



4.2 Program play process



Appendix1 Attribute list

Model	Attribute name	Description	Default value	Application instructions
System	controllertype	Controller model , see Appendix3	little endian Decimal model, Example 8536, 8792, 9048 etc	-
	pid	*Controller ID*	*<32-bit string starting with "50">*	-
	barcode	Controller bar code	<Actual barcode>	-
	controllername	Controller name	Empty	setProperty
	width	Screen width	<default width>	setScreenSize
	height	Screen height	<default height>	setScreenSize
	Screendata	Screen parameter mark	1	-
	foldtype	Fold screen type	0	SetFoldScreen
	foldcount	fold count number of lines	Empty	SetFoldScreen
	foldwidth	Width of each line of horizontal folding screen	Empty	SetFoldScreen
	foldheight	Vertical folding screen width of each column	Empty	SetFoldScreen
	logicwidth	Logical width	Empty	-
	logicheight	Logical height	Empty	-
	screenrotation	Screen rotation angle : 0,90,180,270	0	setScreenSize
	gpiomode	IO program select mode: off/0、discrete/1、combined/2、gray/3	off	updateGpioMode
	serialproperty	Serial port mode parameters	Empty	setSerial
	prompt	Prompt information switch	on	setProperty
Firmware	firmwareversion	Firmware version	<yymmddxx>	updateFirmware
	Playerversion	Player version	<yymmddxx>	updateFirmware
	Reliedversion	the rely firmware version	<yymmddxx>	updateFirmware
	fpgaversion	FPGA version	<yymmddxx>	updateFirmware
Network	dnsserver	Domain name server address	Empty	setNetworkOption
	mac	Ethernet MAC address	<actual MAC>	setNetworkOption
	ipmode	Ethernet card IP address allocation method dhcp/static	static	setNetworkOption
	ip	Ethernet IP address	192.168.0.199	setNetworkOption
	subnetmask	Ethernet card subnet mask	255.255.255.0	setNetworkOption
	gateway	Ethernet card gateway	192.168.0.1	setNetworkOption
	wificonnectmode	WiFi address allocation method dhcp/static	static	setNetworkOption
	wifiipaddress	WiFi IP address	192.168.11.101	setNetworkOption
	wifisubnetmask	WiFi subnet mask	255.255.255.0	setNetworkOption
	wifigateway	WiFi gateway	192.168.11.1	setNetworkOption

	apipaddress	AP mode IP address	192.168.22.1	setApproperty
	apssid	AP mode hotspot name (the hotspot key is not in the attribute list, it can be set but cannot be checked)	<actual barcode>	setApproperty
	restartnetwork	Identifies whether the network has been restarted after setNetworkOption : wait/completed	completed	-
	serverip	Common server agent IP address	Empty	setProperty
	serverport	Normal server agent port	Empty	setProperty
	cloudip	Cloud server agent IP address	139.196.231.196	setProperty
	cloudport	Cloud server agent port	3802	setProperty
	clouduserid	Cloud server user ID	Empty	setProperty
	jtcproperty	1. JTC proxy address 2. JTC proxyport 3. Network mode: server/client 4. Protocol type: 5. Mode device address: 6. Baud rate: 7. Data packet length It is used to set JTC agent properties, separated by "," and delivered at a fixed location.	Empty	setProperty
	servermode	Server mode：off、server、servertls、cloud、cloudtls、jtcproxy	cloud	switchServerMode
	ppp_apn ①	4G Module dial APN (access point name)	Empty	setProperty
	ppp_number ①	4G Modular dial number	Empty	setProperty
	ppp_username ①	4GModular dial user name	Empty	setProperty
	ppp_password ①	4GModular dial password	Empty	setProperty
Time zone	timezoneflag	on/off	off	setTimezoneServer
	timezone	primary time zone/secondary time zone	Asia/Shanghai	setTimezoneServer
	timezoneserver	Automatic time service network address	120.24.166.46	setTimezoneServer
program	playlist	Current program playlist	Empty	play
	programlockedstatus	Program lock status, 0/1	0	lockProgram
	programlockedname	Locked program name	Empty	lockProgram
	playermode	Play mode	0	switchplayermode
FTP	ftpserveraddr	ftp server address; obsolete, can be used to store common information	Empty	setProperty
	ftpserverport	ftp server port; obsolete, can be used to save common information	Empty	setProperty
	ftploginname	ftp server username; obsolete,	Empty	setProperty

		can be used to save common information		
	ftploginpassword	ftp server password; obsolete, can be used to save common information	Empty	setProperty
Other	ipflag	IP flag on/off	off	setProperty
	outputtype	Output type LCD/DVI	LCD	setOutputType
	loglevel	Log level: DEBUG/INFO/WARNING/ERROR	INFO	-
	storagemedia	Storage media：emmc,sd,usb1	emmc	setStorageMedia
	screenlockedstatus	on/off	off	lockScreen
	screenonoffstatus	on/off	on	screenOnOff
	customscreenstatus	Time switch screen action list	Empty	customScreenOnOff
	volume	Volume：0-100	100	setVolume
	brightness	Brightness 1-255	255	systemBrightness
	brightnessmode	Brightness mode： System instantly brighten Custom timing brighten Auto brighten	system	systemBrightness customBrightness autoBrightness
	httpserverport	httpserver 监听的 port	80	-
	scheduletaskflag	true/false	false	-
	i2cnum	I2C host device serial number	2	-
	i2caddress	I2C device address	0x23	-
	optimizedspeed	on/off （not open）	on	setProperty
	language	Prompt message language	zh_CN	setLanguage
	bxparam	BX parameters		setProperty
	customize	Define parameters from the customer	Empty	setProperty

Note: ① Normal network does not need to be set, special network requires mobile operator to provide specific parameters

Appendix2 Error list

Error	Define	Error Description
1	ERR_HTTP_REQUEST_EMPTY	HTTP Request parameter is empty
2	ERR_HTTP_REQUEST_METHOD	HTTP request method Error
3	ERR_PROTOCOL_PARSE	Protocol analysis Error
4	ERR_PROTOCOL_NAME	Protocol name Error
5	ERR_PROTOCOL_VERSION	Protocol versionError
6	ERR_PID	PID Error
7	ERR_BARCODE	Controller barcode Error
8	ERR_HTTP_REQUEST_PARAMETER_KEY	Request parameter key Error
9	ERR_CONFIG_PARSE	Configuration file analysis Error
10	ERR_PERMISSION	Insufficient permissions
11	ERR_INVALID_AUTHENTICATION	User authentication is invalid
12	ERR_ACCESS_VIOLATION	Unauthorized access
13	ERR_IO_READ_WRITE	Input and output operations Error
14	ERR_COMMAND_PARAMETER_KEY	Request command parameter error
15	ERR_COMMAND_CALL	Request command call error
16	ERR_COMMAND_PROCESS	Request command processing error
17	ERR_COMMAND_NOT_EXISTS	Request command does not exist
18	ERR_COMMAND_PARAMETER_EMPTY	Request command parameter is empty
19	ERR_COMMAND_EXECUTE	Error System command execution error
20	ERR_COMMAND_PARAMETER_VALUE	Request command parameter value error
21	ERR_USER_NOT_EXISTS	User not exist
22	ERR_USER_PASSWORD	Password error
23	ERR_STORAGE_MEDIA_NOT_EXISTS	Media storage medium does not exist
24	ERR_FILE_PATH	File path error
25	ERR_MAC_FORMAT	MAC address format Error
26	ERR_UDP_TRANSMIT	UDP transmit Error
27	ERR_VERIFICATION_CODE	Verification Error
28	ERR_NO_FIRMWARE	Firmware not exist

29	ERR_USER_WORK_PATH	Failed to create user working directory
30	ERR_PLAYER_CMD	The player executes the command error
31	ERR_GET_WIFI_LIST	Failed to get hotspot list
32	ERR_WIFI_CONNECT_TIMEOUT	Hotspot connection timed out
33	ERR_HOTSPOT_NOT_FOUND	Hotspot not found
34	ERR_WIFI_PASSWORD	Hotspot Password Error
35	ERR_NETWORK_RESTART	The network is restarting
36	ERR_XSER_COMMAND_FAILED	XSER command processing failed
37	ERR_SEARCH_SENSOR_modbus Y	Searching for sensors
38	ERR_ LANGUAGE_NOT_SUPPORTED	Unsupported language
39	ERR_DATABASE_CONNECT_FAILED	Failed to connect to the database server
40	ERR_DATABASE_UNKNOW_TYPE	Database type Error
255	ERR_OTHER	Other Error

Appendix3 BX-Y series summary

Model	Type code		Max resolution	Max width /height	Min width /height
	Front LEVEL	Back LEVEL			
BX-Y04	Small endian0x2058/8280 Big endian 0x5820/22560	0x0A86/2694	65,536 (256x256)	1024/256	64/32
BX-Y08	Small endian0x2158/8536 Big endian 0x5821/22561	0x0A87/2695	131,072 (512x256)	1024/512	64/32
BX-Y2	Small endian0x2258/8792 Big endian 0x5822/22562	0xA9B/2715	614,400 (1024x600)	2048/2048	64/32
BX-Y3	Small endian0x2358/9048 Big endian 0x5823/22563	0xA9C/2716	1,310,720 (1280x1024)	2048/2048	64/32
BX-Y2L	Small endian0x2458/9304 Big endian 0x5824/22564	0xA9D/2717	262,144 (1024x256)	2048/2048	64/32
BX-Y5E	Small endian0x2958/10584 Big endian 0x5829/22569	0xB10/2832	2,560,000 (2560x1000)	3840/3840	64/64
BX-Y1L	Small endian0x2758/10072 Big endian 0x5827/22567	0xA89	262,144 (1024x256)	2048/2048	64/32
BX-Y1	Small endian0x2558/9560 Big endian 0x5825/22565	0xA88	614,400 (1024x600)	2048/2048	64/32
BX-Y1A	Small endian0x2d58/11608 Big endian 0x582d/22573	0xA8C	614,400 (1024x600)	2048/2048	64/32
BY-YL	Small endian0x2a58/10840 Big endian 0x582a/22570	-	2,073,600 (1920x1080)	1920/1080	720/480
BX-Y3E	Small endian0x2858/10328 Big endian 0x5828/22568	Pending	1,310,720 (1280x1024)	1920/1920	64/32

Appendix4 Standard time zone summary

Africa time zone		
Africa/Abidjan	Africa/Accra	Africa/Addis_Ababa
Africa/Algiers	Africa/Asmara	Africa/Bamako
Africa/Bangui	Africa/Banjul	Africa/Bissau
Africa/Blantyre	Africa/Brazzaville	Africa/Bujumbura
Africa/Cairo	Africa/Casablanca	Africa/Ceuta
Africa/Conakry	Africa/Dakar	Africa/Dar_es_Salaam
Africa/Djibouti	Africa/Douala	Africa/El_Aaiun
Africa/Freetown	Africa/Gaborone	Africa/Harare
Africa/Johannesburg	Africa/Juba	Africa/Kampala
Africa/Khartoum	Africa/Kigali	Africa/Kinshasa
Africa/Lagos	Africa/Libreville	Africa/Lome
Africa/Luanda	Africa/Lubumbashi	Africa/Lusaka
Africa/Malabo	Africa/Maputo	Africa/Maseru
Africa/Mbabane	Africa/Mogadishu	Africa/Monrovia
Africa/Nairobi	Africa/Ndjamena	Africa/Niamey
Africa/Nouakchott	Africa/Ouagadougou	Africa/Porto-Novo
Africa/Sao_Tome	Africa/Tripoli	Africa/Tunis
Africa/Windhoek		
America time zone		
America/Adak	America/Anchorage	America/Anguilla
America/Antigua	America/Araguaina	America/Argentina/Buenos_Aires
America/Argentina/Catamarca	America/Argentina/Cordoba	America/Argentina/Jujuy
America/Argentina/La_Rioja	America/Argentina/Mendoza	America/Argentina/Rio_Gallegos
America/Argentina/Salta	America/Argentina/San_Juan	America/Argentina/San_Luis
America/Argentina/Tucuman	America/Argentina/Ushuaia	America/Aruba
America/Asuncion	America/Atikokan	America/Bahia
America/Bahia_Banderas	America/Barbados	America/Belem
America/Belize	America/Blanc-Sablon	America/Boa_Vista
America/Bogota	America/Boise	America/Cambridge_Bay
America/Campo_Grande	America/Cancun	America/Caracas
America/Cayenne	America/Cayman	America/Chicago
America/Chihuahua	America/Costa_Rica	America/Creston
America/Cuiaba	America/Curacao	America/Danmarkshavn
America/Dawson	America/Dawson_Creek	America/Denver
America/Detroit	America/Dominica	America/Edmonton
America/Eirunepe	America/El_Salvador	America/Fort_Nelson
America/Fortaleza	America/Glace_Bay	America/Godthab
America/Goose_Bay	America/Grand_Turk	America/Grenada
America/Guadeloupe	America/Guatemala	America/Guayaquil
America/Guyana	America/Halifax	America/Havana
America/Hermosillo	America/Indiana/Indianapolis	America/Indiana/Knox
America/Indiana/Marengo	America/Indiana/Petersburg	America/Indiana/Tell_City
America/Indiana/Vevay	America/Indiana/Vincennes	America/Indiana/Winamac
America/Inuvik	America/Iqaluit	America/Jamaica
America/Juneau	America/Kentucky/Louisville	America/Kentucky/Monticello
America/Kralendijk	America/La_Paz	America/Lima
America/Los_Angeles	America/Lower_Princes	America/Maceio
America/Managua	America/Manaus	America/Marigot
America/Martinique	America/Matamoros	America/Mazatlan
America/Menominee	America/Merida	America/Metlakatla
America/Mexico_City	America/Miquelon	America/Moncton
America/Monterrey	America/Montevideo	America/Montserrat
America/Nassau	America/New_York	America/Nipigon

America/Nome	America/Noronha	America/North_Dakota/Beulah
America/North_Dakota/Center	America/North_Dakota/New_Salem	America/Ojinaga
America/Panama	America/Pangnirtung	America/Paramaribo
America/Phoenix	America/Port-au-Prince	America/Port_of_Spain
America/Porto_Velho	America/Puerto_Rico	America/Rainy_River
America/Rankin_Inlet	America/Recife	America/Regina
America/Resolute	America/Rio_Branco	America/Santarem
America/Santiago	America/Santo_Domingo	America/Sao_Paulo
America/Scoresbysund	America/Sitka	America/St_Barthelemy
America/St_Johns	America/St_Kitts	America/St_Lucia
America/St_Thomas	America/St_Vincent	America/Swift_Current
America/Tegucigalpa	America/Thule	America/Thunder_Bay
America/Tijuana	America/Toronto	America/Tortola
America/Vancouver	America/Whitehorse	America/Winnipeg
America/Yakutat	America/Yellowknife	
Antarctica time zone		
Antarctica/Casey	Antarctica/Davis	Antarctica/DumontDUrville
Antarctica/Macquarie	Antarctica/Mawson	Antarctica/McMurdo
Antarctica/Palmer	Antarctica/Rothera	Antarctica/Syowa
Antarctica/Troll	Antarctica/Vostok	
Asia time zone		
Asia/Aden	Asia/Almaty	Asia/Amman
Asia/Anadyr	Asia/Aqtau	Asia/Aqtobe
Asia/Ashgabat	Asia/Baghdad	Asia/Bahrain
Asia/Baku	Asia/Bangkok	Asia/Barnaul
Asia/Beirut	Asia/Bishkek	Asia/Brunei
Asia/Chita	Asia/Choibalsan	Asia/Colombo
Asia/Damascus	Asia/Dhaka	Asia/Dili
Asia/Dubai	Asia/Dushanbe	Asia/Gaza
Asia/Hebron	Asia/Ho_Chi_Minh	Asia/Hong_Kong
Asia/Hovd	Asia/Irkutsk	Asia/Jakarta
Asia/Jayapura	Asia/Jerusalem	Asia/Kabul
Asia/Kamchatka	Asia/Karachi	Asia/Kathmandu
Asia/Khandyga	Asia/Kolkata	Asia/Krasnoyarsk
Asia/Kuala_Lumpur	Asia/Kuching	Asia/Kuwait
Asia/Macau	Asia/Magadan	Asia/Makassar
Asia/Manila	Asia/Muscat	Asia/Nicosia
Asia/Novokuznetsk	Asia/Novosibirsk	Asia/Omsk
Asia/Oral	Asia/Phnom_Penh	Asia/Pontianak
Asia/Pyongyang	Asia/Qatar	Asia/Qyzylorda
Asia/Rangoon	Asia/Riyadh	Asia/Sakhalin
Asia/Samarkand	Asia/Seoul	Asia/Shanghai
Asia/Singapore	Asia/Srednekolymsk	Asia/Taipei
Asia/Tashkent	Asia/Tbilisi	Asia/Tehran
Asia/Thimphu	Asia/Tokyo	Asia/Tomsk
Asia/Ulaanbaatar	Asia/Urumqi	Asia/Ust-Nera
Asia/Vientiane	Asia/Vladivostok	Asia/Yakutsk
Asia/Yekaterinburg	Asia/Yerevan	
Atlantic Time Zone		
Atlantic/Azores	Atlantic/Bermuda	Atlantic/Canary
Atlantic/Cape_Verde	Atlantic/Faroe	Atlantic/Madeira
Atlantic/Reykjavik	Atlantic/South_Georgia	Atlantic/St_Helena
Atlantic/Stanley		
Australia time zone		
Australia/Adelaide	Australia/Brisbane	Australia/Broken_Hill

Australia/Currie	Australia/Darwin	Australia/Eucla
Australia/Hobart	Australia/Lindeman	Australia/Lord_Howe
Australia/Melbourne	Australia/Perth	Australia/Sydney
European time zone		
Europe/Amsterdam	Europe/Andorra	Europe/Astrakhan
Europe/Athens	Europe/Belgrade	Europe/Berlin
Europe/Bratislava	Europe/Brussels	Europe/Bucharest
Europe/Budapest	Europe/modbus ingen	Europe/Chisinau
Europe/Copenhagen	Europe/Dublin	Europe/Gibraltar
Europe/Guernsey	Europe/Helsinki	Europe/Isle_of_Man
Europe/Istanbul	Europe/Jersey	Europe/Kaliningrad
Europe/Kiev	Europe/Kirov	Europe/Lisbon
Europe/Ljubljana	Europe/London	Europe/Luxembourg
Europe/Madrid	Europe/Malta	Europe/Mariehamn
Europe/Minsk	Europe/Monaco	Europe/Moscow
Europe/Oslo	Europe/Paris	Europe/Podgorica
Europe/Prague	Europe/Riga	Europe/Rome
Europe/Samara	Europe/San_Marino	Europe/Sarajevo
Europe/Simferopol	Europe/Skopje	Europe/Sofia
Europe/Stockholm	Europe/Tallinn	Europe/Tirane
Europe/Ulyanovsk	Europe/Uzhgorod	Europe/Vaduz
Europe/Vatican	Europe/Vienna	Europe/Vilnius
Europe/Volgograd	Europe/Warsaw	Europe/Zagreb
Europe/Zaporozhye	Europe/Zurich	
India time zone		
Indian/Antananarivo	Indian/Chagos	Indian/Christmas
Indian/Cocos	Indian/Comoro	Indian/Kerguelen
Indian/Mahe	Indian/Maldives	Indian/Mauritius
Indian/Mayotte	Indian/Reunion	
Pacific Time Zone		
Pacific/Apia	Pacific/Auckland	Pacific/Bougainville
Pacific/Chatham	Pacific/Chuuk	Pacific/Easter
Pacific/Efate	Pacific/Enderbury	Pacific/Fakaofo
Pacific/Fiji	Pacific/Funafuti	Pacific/Galapagos
Pacific/Gambier	Pacific/Guadalcanal	Pacific/Guam
Pacific/Honolulu	Pacific/Johnston	Pacific/Kiritimati
Pacific/Kosrae	Pacific/Kwajalein	Pacific/Majuro
Pacific/Marquesas	Pacific/Midway	Pacific/Nauru
Pacific/Niue	Pacific/Norfolk	Pacific/Noumea
Pacific/Pago_Pago	Pacific/Palau	Pacific/Pitcairn
Pacific/Pohnpei	Pacific/Port_Moresby	Pacific/Rarotonga
Pacific/Saipan	Pacific/Tahiti	Pacific/Tarawa
Pacific/Tongatapu	Pacific/Wake	Pacific/Wallis
Other Time Zone		
Africa/Asmera	Africa/Timbuktu	America/Argentina/ComodRivadavia
America/Atka	America/Buenos_Aires	America/Catamarca
America/Coral_Harbour	America/Cordoba	America/Ensenada
America/Fort_Wayne	America/Indianapolis	America/Jujuy
America/Knox_IN	America/Louisville	America/Mendoza
America/Montreal	America/Porto_Acre	America/Rosario
America/Santa_Isabel	America/Shiprock	America/Virgin
Antarctica/South_Pole	Asia/Ashkhabad	Asia/Calcutta
Asia/Chongqing	Asia/Chungking	Asia/Dacca
Asia/Harbin	Asia/Istanbul	Asia/Kashgar
Asia/Katmandu	Asia/Macao	Asia/Saigon

Asia/Tel_Aviv	Asia/Thimbu	Asia/Ujung_Pandang
Asia/Ulan_Bator	Atlantic/Faeroe	Atlantic/Jan_Mayen
Australia/ACT	Australia/Canberra	Australia/LHI
Australia/North	Australia/NSW	Australia/Queensland
Australia/South	Australia/Tasmania	Australia/Victoria
Australia/West	Australia/Yancowinna	Brazil/Acre
Brazil/DeNoronha	Brazil/East	Brazil/West
Canada/Atlantic	Canada/Central	Canada/East-Saskatchewan
Canada/Eastern	Canada/Mountain	Canada/Newfoundland
Canada/Pacific	Canada/Saskatchewan	Canada/Yukon
CET	Chile/Continental	Chile/EasterIsland
CST6CDT	Cuba	EET
Egypt	Eire	EST
EST5EDT	Etc/GMT	Etc/GMT+0
Etc/GMT+1	Etc/GMT+10	Etc/GMT+11
Etc/GMT+12	Etc/GMT+2	Etc/GMT+3
Etc/GMT+4	Etc/GMT+5	Etc/GMT+6
Etc/GMT+7	Etc/GMT+8	Etc/GMT+9
Etc/GMT-0	Etc/GMT-1	Etc/GMT-10
Etc/GMT-11	Etc/GMT-12	Etc/GMT-13
Etc/GMT-14	Etc/GMT-2	Etc/GMT-3
Etc/GMT-4	Etc/GMT-5	Etc/GMT-6
Etc/GMT-7	Etc/GMT-8	Etc/GMT-9
Etc/GMT0	Etc/Greenwich	Etc/UCT
Etc/Universal	Etc/UTC	Etc/Zulu
Europe/Belfast	Europe/Nicosia	Europe/Tiraspol
Factory	GB	GB-Eire
GMT	GMT+0	GMT-0
GMT0	Greenwich	Hongkong
HST	Iceland	Iran
Israel	Jamaica	Japan
Kwajalein	Libya	MET
Mexico/BajaNorte	Mexico/BajaSur	Mexico/General
MST	MST7MDT	Navajo
NZ	NZ-CHAT	Pacific/Ponape
Pacific/Samoa	Pacific/Truk	Pacific/Yap
Poland	Portugal	PRC
PST8PDT	ROC	ROK
Singapore	Turkey	UCT
Universal	US/Alaska	US/Aleutian
US/Arizona	US/Central	US/East-Indiana
US/Eastern	US/Hawaii	US/Indiana-Starke
US/Michigan	US/Mountain	US/Pacific
US/Pacific-New	US/Samoa	UTC
W-SU	WET	Zulu

Appendix5 Sensor address list

Sensor address uses unsigned short integers: 0x0000~0xFFFF, where the upper 8 bits are used to identify the sensor modbus interface; the lower 8 bits are used to identify device addresses on different modbus es.

Address	Description	Mark
0x0000~0x00FF	Reserve	
0x0100~0x07FF	Onboard single modbus (One Wire) interface	Supports up to 7 onboard single modbus interfaces; BX-Y series only has No. 1, which is temporarily unavailable.
0x0800~0x0FFF	Onboard I2C modbus interface	Supports up to 8 onboard I2C modbus interfaces; BX-Y series only has No. 1.
0x1000~0x17FF	Onboard RS232 serial modbus interface	Supports up to 8 onboard RS232 modbus interfaces; BX-Y series only has No. 1。
0x1800~0x1FFF	Onboard RS485 serial modbus interface	Supports up to 8 onboard RS485 modbus interfaces; BX-Y series has only No. 1, and it is multiplexed with RS232.
0x2000~0x27FF	USB to RS232 serial modbus interface	Supports up to 8 USB-to-RS232 modbus interfaces; BX-Y series supports No. 1 and No. 2: Single USB port supports No. 1, and dual USB ports are below No. 1.
0x2800~0x2FFF	USB to RS485 serial modbus interface	Supports up to 8 USB-to-RS232 modbus interfaces; BX-Y series supports No. 1 and No. 2: Single USB port supports No. 1, and dual USB ports are below No. 1.
0x3000~0x30FF	Universal environmental sensor modbus interface	Only BX-Y08A and BX-Y1A model control cards support this interface
0x3100~0x7FFF	Reserve	
0x8000~0x80FF	Network port 1 multifunction board (VMF) address range	The address of the first multi-function board connected in series under the network port 1 is 0x8000, the second is 0x8001, and so on
0x8100~0x81FF	Network port 2 multifunction board (VMF) address range	
…	…	
0x8F00~0x8FFF	Network port 16 multifunction board (VMF) address range	
0x9000~0xFFFF	Reserve	

Sensor address list

Device address	Function Description
0	Empty sensor
1	Air quality sensor PM2.5 (unitType=0) or PM10 (unitType=1)
2	Wind speed sensor
3	Wind direction sensor
4	Noisy sensor
5	Temp (sequence=261) humidity (sequence=262) sensor of composite sensor
6	Noisy sensor of composite sensor
7	Air quality sensor of composite sensor PM2.5 (unitType=0) or PM10

	（unitType=1）
8	Atmospheric pressure sensor of composite sensor
9	Light intensity sensor of composite sensor
10	Negative oxygen ion monitor

Appendix6 Sensor function list

Sensor function list used to distinguish the sensor types on the multi-function card. Other sensor types are uniquely determined by the Sensor address (8-bit modbus address + 8-bit device address).

Item	Function Description
0	No sensor, or unknown sensor
1~127：Corresponding to the sensors implemented on the multi-function card (VMF) (also applicable to on-board sensors, only take #1 modbus), all sensors are self-operated by the company without special instructions	
1	I^2C modbus brightness sensor
2	Temperature sensor, when the Sensor address is the range of the multi-function board, it corresponds to the temperature sensor connected to the #1 single modbus on the multi-function board; if there is a humidity sensor on the modbus , it corresponds to the temperature sensor in the temperature and humidity sensor
3	Temperature sensor, only when the Sensor address is the range of the multi-function board, it corresponds to the temperature sensor connected to the #2 single modbus on the multi-function board; if there is a humidity sensor on the modbus , it corresponds to the temperature sensor in the temperature and humidity sensor
4	The humidity sensor in the temperature and humidity sensor, when the Sensor address is the range of the multi-function board, it corresponds to the humidity sensor in the temperature and humidity sensor connected to the #1 single modbus on the multi-function board (there is no separate humidity sensor)
5	Temperature sensor, only when the Sensor address is the range of the multi-function board, it corresponds to the temperature sensor connected to the #2 single modbus on the multi-function board; if there is a humidity sensor on the modbus , it corresponds to the temperature sensor in the temperature and humidity sensor
6	Smoke sensor (alarm)
7~255	Reserve, processed as 0
256~512：Support modbus protocol sensor（mainly is for weather sensor now）， they are all self-operated sensors if no specifically stated	
256	Air quality sensor (powder sensor，PM2.5）
257	wind speed sensor
258	Wind direction sensor
259	Noise sensor
260	Air quality sensor （powder sensor，PM10）
261	Temperature sensor in composite sensor
262	Temperature&humidity sensor in composite sensor
263	Noise sensor in composite sensor
264	PM2.5 air quality sensor in composite sensor
265	PM10 air quality sensor in composite sensor
266	Atmospheric pressure sensor in composite sensor
267	Light sensor in composite sensor
268~282：Only suitable for general environmental sensor modbus interface（0x3000~0x30FF）	
268	Temperature sensor, 485 modbus interface Temperature sensor of temperature and humidity sensor
269	Humidity sensor, 485 modbus interface Humidity sensor of temperature and humidity sensor
270	Brightness sensor, 485 modbus interface
271	Atmospheric negative (oxygen) ion monitor
272	PM100 air quality sensor in composite sensor
273	Air quality sensor（PM100）

274	Liquid level sensor
275	Universal sensor 0（Not used yet）
276~282	Universal sensor 1~7（Not used yet）
283~512	Reserve， process as 0
512~： special sensor	
512~	Reserve， process as 0

appendix 7　Language list of control card prompt information

Mark	Instruction	Mark	Instruction
zh_CN	Simple Chinese	zh_TW	Traditional Chinese
en_US	English	ru_RU	Russian
vi_VN	Vietnamese		

Appendix8 Dynamic area escape description

Dynamic area keyList：

- ✓ Dynamic area keyList only supports single element index escape in json format, with increasing levels
- ✓ Key value escape delimiter is double quotation mark
- ✓ If it is an array, use square brackets plus index value [n]
- ✓ The escaped string is issued in base64 encoded form

Sample：

Query URL:

```
http://192.168.88.106/testrestful/resource? key=testKey
```

Receive the data:

```
{
  "result": [
    {
      "name": "Jony",
      "age": "99"
    },
    {
      "message": [
        {
          "random": 87431
        },
        [
          {
            "stampLocal": "2020-04-23 18:49:15",
            "stampUTC": "2020-04-23 10:49:15"
          },
          "TEST 4"
        ],
        [
          "TEST 1",
          "Test text two",
          "Test text three"
        ]
      ]
    }
  ]
}
```

If the element to be indexed is "stampUTC", the index escape is as follows:

Escape string:

```
result"[1]"message"[1]"[0]"stampUTC
```

base64 coding:

```
cmVzdWx0IlsxXSJtZXNzYWdlIlsxXSJbMF0ic3RhbXBVVEM=
```

The final form of attribute transmission:

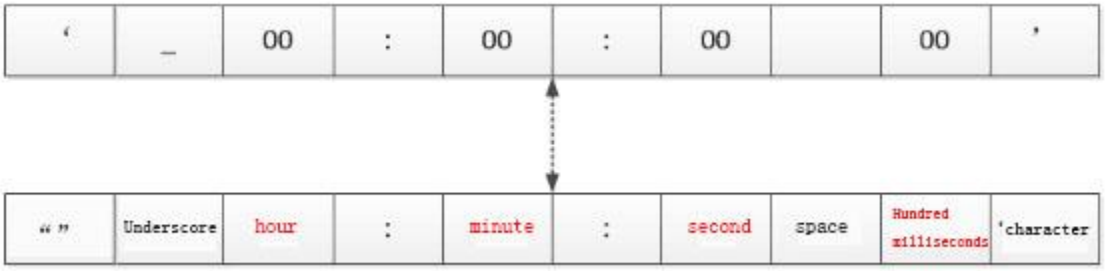
```
"keyList": "cmVzdWx0IlsxXSJtZXNzYWdlIlsxXSJbMF0ic3RhbXBVVEM="
```

Appendix9 Countdown format description

"Text/1" type dynamic zone supports countdown function. The countdown base is issued through the "content" field. Divided into two formats. All are issued in base64 encoding format.

Format 1: Countdown base hours are converted to minutes. When the total countdown is greater than 59 seconds, the minutes and seconds are displayed with a display accuracy of 1 second. When the total countdown remaining is 59 seconds, only the seconds are displayed with a display accuracy of 0.1 seconds.

Format:



Format description:

Hours: Hours, which will eventually be converted to minutes.

minutes: the number of minutes.

Seconds: the number of seconds.

Hundred milliseconds: Take 100 milliseconds as the unit, the example is as follows, and so on. Maximum support 09.

00: 0 milliseconds

01: 100 milliseconds

02: 200 milliseconds

09: 900 milliseconds

The rest are fixed formats.

Sample 1:

The countdown base is 85510200 milliseconds, and the content of the "content" field is the base64 encoding of "' _23:45:10 02' "{

```
    …
      "content":"4oCZXzIzOjQ1OjEwIDAy4oCZ",
    …
}
```

The display is as follows: starting from 1425 minutes and 10 seconds, when the countdown starts to 1 minute, the next second starts to display the accuracy of 0.1 seconds, and the countdown ends to display

00.0