

Shanghai Onbon Technology INC.

Async Full Color Communication Protocol

Communication protocol

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	2019-8-7	原野	新增“ 切换播放模式 ”指令 修改“ 屏幕截取 ”指令，删除 delaytime 参数
	2019-11-12	黄明涛	修改“ setApAttributes ”，增加关闭 WiFi 热点功能 修改“ setLogo ”指令 新增“ addVoice ”指令，用于语音合成 更新附录 1、3
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	2019-12-19	原野	新增 属性 : “ jtcproxyhost ”, “ jtcproxyport ”, “ jtcproxymode ”, “ jtcproxyprotocol ” 扩展 属性 : “ servermode ”取值 扩展“ 切换服务器模式 ”指令 新增“ 添加 TLS 证书 ”指令和“ 删除 TLS 证书 ”指令
	2019-12-19	黄明涛	扩展“ 切换服务器模式 ”至 HTTP 通信指令 将“ 添加 TLS 证书 ”和“ 删除 TLS 证书 ”修改为 HTTP 通信指令
	2020-08-28	黄明涛	变更章节目录，增加 UDP 报文示例 增加 UDP 通信数字签名认证报文示例 增加 UDP 普通报文示例 整合 jtc 相关参数为“ jtcattributes ”， 附录 1 扩展 BX-Y 系列型号汇总表 ，新增型号 增加“ 文件认证开关 ”指令 增加“ 播放音频命令 ” 增加 传感器地址段 和 传感器功能序号 修改“ 移动文件(夹) ”指令，增加素材认证相关参数 修改“ 从 URL 下载文件 ”指令，增加素材认证相关参数

			<p>修改“更新播放动态区”指令，增加“更新动态区素材”指令，增加更新本地素材功能和素材文件认证功能</p> <p>增加动态区“倒计时开关”指令</p> <p>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</p> <p>增加“设置串口”指令，新增属性 serialattributes</p>
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Async Full Color Communication Protocol

Asynchronous Full Color Communication Protocol

1. Protocol Overview

"Asynchronous Full Color Communication Protocol" (we call "Second Generation Protocol" as below) is guiding file for the communication between PC software and BX-Y series controllers.

The core of the Second Generation Protocol is remotely call of json-rpc, and it is composed by the ports of HTTP, UDP etc. "Second Generation Protocol" explained UDP and HTTP protocols, the point of these two protocols is different.

UDP mainly used for initial setup of asynchronous full color controller (we call controller as below), for network settings. After finish network settings, the mainly to use HTTP: set screen parameters, scan parameters, send programs and so on.

2. Protocol Communication

- ✓ All commands are communicated by PC software, controller receive commands and return to execute. All commands from controller adopt Json format bytes, and all use UTF-8 code. Json is not sensitive for capital or lower case bytes, but we suggest to use capital and lower case bytes; "command name" is not sensitive too; Others, are sensitive.
- ✓ "command name" is not sensitive for capital or lower case bytes, but in command to read easily, we will write by hump in this file.
- ✓ Without special illustration, all commands execute successful return, and if without "return parameters", all use uniform return format. As below:

```
{
  "remotefunction": {
    "name": "[command name]",
    "networkdevice": "eth0" # eth0、wifi_sta、wifi_ap
  }
}
```

'networkdevice' only uses for the reply of UDP, as to indicate the reply by network card equipment.

- ✓ Without special illustration, all commands execute falling return, as below:

```
{
  "remotefunction": {
    "name": "[command name]",
    "networkdevice": "eth0", # eth0、wifi_sta、wifi_ap
    "error": {
      "code": "[error code]",
      "mesg": "[error message]"
    }
  }
}
```

'networkdevice' only uses for the reply of UDP, as to indicate the reply by network card equipment.

- ✓ In this file, all command examples are format aligning, but in real situation, as to cut data length, lower packet loss probability, you can remove this format aligning.

3. Communication command

UDP communication command is command format used by UDP proxy. UDP proxy transfers remote controlling command to controller with broadcast method in LAN by non-linked UDP protocol. Controllers then handle commands according to corresponding rules and reply result by broadcast method in LAN.

When controller receives UDP protocol frame, it will match by analysis targetpid and targetbarcode. After matched successfully, controller will execute commands of this protocol frame and reply. If UDP protocol frame does not include targetpid and targetbarcode, or include these two but value is blank, means controllers which got this protocol frame must execute commands and reply.

Port of controller for UDP proxy monitor non-encrypted file is 10001; Port of controller for UDP proxy monitor encrypted file is 10002.

3.1 UDP message

3.1.1 UDP communication common message

Common UDP message as below. Without special illustration, UDP encrypted message or communication certificate message will follow common UDP message format, and extend based on this.

✓ Command Example:

```
{
  "protocol": {
    "name": "YQ-COM2", "version": "1.0",
    "remotefunction": {
      "name": "指令名 command name",
      "tracecode": "112233",
      "input": {
        "parameter1": "value1",
        "parameter2": "value2"
      }
    }
  }
}
```

Parameters:

- ✓ "protocol":
 - ✓ "name": Protocol name
 - ✓ "version": Protocol version
 - ✓ "remotefunction": Command entity
- ✓ "remotefunction":
 - ✓ "name": command name
 - ✓ "tracecode": Command trace code, 6 digit decimalism integer, range (10000~999999).
- "input": Command parameters

✓ Reply example

```
{
  "targetpid": "50C811344D45594D4110000012B755AB",
  "targetbarcode": "C0Y2L01805100002",
  "remotefunction": {
    "name": "command name",
```

```

        "verificationcode": "20180515184625583374",
        "networkdevice": "eth0",
        "tracecode": "112233",
        "output": {
            "parameter1": "value1"
        }
    }
}
    
```

Parameters:

- ✓ "targetpid": Controller PID
- ✓ "targetbarcode": Controller barcode
- ✓ "remotefunction": Command reply entity
 - ✓ "name": Command name
 - ✓ "tracecode": Command trace code. Same with the command which was sent. Only reply when the message you received include this.
 - ✓ "output": Replied command parameters

3.1.2 UDP encrypted message

- ✓ UDP Encrypted method for UDP message:
 - ✓ 0x01: XOR result of original encrypted seed and original data file byte by byte as ciphertext.
 - ✓ 0x02: XOR result of original encrypted seed data and capital byte of original text as ciphertext capital byte.
 - ✓ 0x03: Encrypted seed XOR one byte, cyclicly shift left one digit as the seed of next byte.
 - ✓ 0x04: Encrypted seed XOR one byte, cyclicly shift right one digit as the seed of next byte.

✓ Controller receive encrypted message:

	N
0x00	0x01
0x01	0x12
0x02 ~ 0xC1	i0b`f}q}~0(i0 s2w0(20KC?Q]_ 0>0dw`a{ } 0(20#<"0>0fs`uwb{v0(0""Q*# ...

- ✓ 0x00: encrypted mode (0x01~0x04)
- ✓ 0x01: encrypted seed (0x00~0xFF)
- ✓ 0x02~0xbe: Encrypted message (only part of example)

✓ Controller reply encrypted message:

	N
0x00	0x02
0x01	0x30
0x02 ~ 0xA2	.0Ki.~ .m.~.s.n.oMwW,.`l.+1.v.y.w.a.v.e.z.q.6.:v.g...f.g.x.~\fFd.u.-. ...

- ✓ 0x00: encrypted mode (0x01~0x04)
- ✓ 0x01: encrypted seed (0x00~0xFF)

- ✓ 0x02~0xA2: encrypted message (only part of example)

Note: original message (0x02~0xA2) format as [3.1.1](#)

3.1.3 UDP communication number signature authentication

UDP communication number signature authentication is a safe authentication mechanism which is used for TSL encrypted server mode. When users switch to encrypted server mode, this mechanism will be started automatically. Send UDP command (excluding searchController), controller will add verificationcode when reply message, as the digest of next command number sign. Under encrypted server mode, controller handle the commands which brings the latest timestamp number signature and fingerprint info of signature certificate, and whatever the command is handled or not, controller reply the latest timestamp.

- ✓ *Command example:*

```
{
  "protocol": {
    "name": "YQ-COM2", "version": "1.0",
    "remotefunction": {
      "name": "command name",
      "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",
      "tracecode": "112233",
      "input": {
        "parameter1": "value1",
        "parameter2": "value2"
      }
    }
  }
}
```

When switch to communication encrypted mode, UDP command (exlude searchController), add "signature" and "fingerprint" in "remotefunction". Number signature adopts timestamp as digest which is replied by last command in controller, and signature with "sha1", BASE64 coding. Fingerprint is SHA1 format.

When add UDP communication authentication certificate, certificate type (type) is "0"

- ✓ *Replay example:*

```
{
  "targetpid": "50C811344D45594D4110000012B755AB",
  "targetbarcode": "C0Y2L01805100002",
  "remotefunction": {
    "name": "command name",
    "verificationcode": "20180515184625583374",
    "networkdevice": "eth0",
    "tracecode": "112233",
    "output": {
      "parameter1": "value1"
    }
  }
}
```

Add "verificationcode" timestamp code as digest of next command signature In command (excluding searchController) which replied message "remotefunction".

3.2 Common UDP command

3.2.1 - searchController

✓ *Command example:*

```
{
  "protocol": {
    "name": "YQ-COM2",
    "version": "1.0",
    "remotefunction": {
      "name": "searchController",
      "input": {
        "barcode": "",
        "pid": "",
        "ipmode": "",
        "ip": "",
        "subnetmask": "",
        "gateway": ""
      }
    }
  }
}
```

It's checking command, used for searching controller, and also for checking controller attributes, sub-key of "input" is the attributes need to be checked ("value" is blank), numbers can be changed. "barcode" and "pid" is default checking attributes. Please check list "Appendix 1".

✓ *Reply example:*

```
{
  "targetpid": "50C811344D45594D4110000012B755AB",
  "targetbarcode": "C0Y2L01805100002",
  "remotefunction": {
    "name": "searchController",
    "networkdevice": "eth0",
    "output": {
      "barcode": "50C811344D45594D4110000008AB53AD",
      "pid": "C0Y2001805150056",
      "ipmode": "dhcp",
      "ip": "192.168.0.199",
      "subnetmask": "255.255.255.0",
      "gateway": "192.168.0.1"
    }
  }
}
```

✓ *Additional description:*

If add "targetpid" and "targetbarcode" in command, can be used to check specified controller attributes, example:

```
{
  "protocol": {
    "name": "YQ-COM2",
    "version": "1.0",
    "targetpid": "50C811344D45594D4110000008AB53AD ",
    "targetbarcode": "C0Y2001805150056",
    "remotefunction": {
      "name": "searchController",
```

```

        "input": {
            "outputtype": "",
        }
    }
}

```

3.2.2 - setNetworkOption

✓ *Command example:*

```

{
  "protocol": {
    "name": "YQ-COM2",
    "version": "1.0",
    "targetpid": "50C811344D45594D411000008AB53AD",
    "targetbarcode": "C0Y2001805150056",
    "remotefunction": {
      "name": "setNetworkOption",
      "input": {
        "ip": "192.168.0.199",
        "subnetMask": "255.255.255.0",
        "gateway": "192.168.0.1",
        "ipmode": "static",
        "wifiipaddress": "192.168.2.199",
        "wifisubnetmask": "255.255.255.0",
        "wifigateway": "192.168.2.1",
        "wificonnectmode": "static"
      }
    }
  }
}

```

Network parameters which can be set for this command, please check Appendix 1. After execute this command, need to sent "restart network" command, then it will be valid. This command will influence the result of "SearchController" command, until "restartNewtork", it will be common. Please check Appendix 1.

3.2.3 - restartNetwork

✓ *Command example:*

```

{
  "protocol": {
    "name": "YQ-COM2",
    "version": "1.0",
    "targetpid": "50C811344D45594D411000008AB53AD",
    "targetbarcode": "C0Y2001805150056",
    "remotefunction": {
      "name": "restartNetwork"
    }
  }
}

```

✓ *Reply example:*

```
{
  "targetpid": "50C811344D45594D4110000012B755AB",
  "targetbarcode": "C0Y2L01805100002",
  "remotefunction": {
    "name": "restartNetwork",
    "networkdevice": "eth0",
    "output": {
      "minwaittime": "5",
      "maxwaittime": "10"
    }
  }
}
```

"restartNetwork" is not real time command, need to inform PC software that how long it will be there as to check executive result:

- ✓ "minwaittime": Minimum waiting time for non real time command, unit is seconds; Suggest you trying to start connect with controller.
- ✓ "maxwaittime": Maximum waiting time for non real time command, unit is seconds.

3.2.4 - setAttributes

✓ *Command example:*

```
{
  "protocol": {
    "name": "YQ-COM2",
    "version": "1.0",
    "targetpid": "50C811344D45594D4110000008AB53AD",
    "targetbarcode": "C0Y2001805150056",
    "remotefunction": {
      "name": "setAttributes",
      "input": {
        "controllername": "Xizang South Road",
        "serverip": "129.168.0.123",
        "serverport": "16800"
      }
    }
  }
}
```

Please check Appendix 1.

3.2.5 - getSsidList

✓ *Command example:*

```
{
  "protocol": {
    "name": "YQ-COM2",
    "version": "1.0",
    "targetpid": "50C811344D45594D4110000008AB53AD",
    "targetbarcode": "C0Y2001805150056",
```



```

    "remotefunction": {
      "name": "getSsidList"
    }
  }
}

```

✓ *Reply example:*

```

{
  "targetpid": "50C811344D45594D4110000012B755AB",
  "targetbarcode": "C0Y2L01805100002",
  "remotefunction": {
    "name": "getSsidList",
    "networkdevice": "eth0",
    "output": {
      "items": [
        {
          "ssid": "NETGEAR40",
          "signallevel": "-60"
        },
        {
          "ssid": "ChinaNet-8E20",
          "signallevel": "-75"
        }
      ]
    }
  }
}

```

This command is to return to peripheral list, including hotspot name and signal strength. List length is not fixed, maybe it is blank.

Parameters:

- ✓ "ssid": hotspot name
- ✓ "signallevel": signal strength (unit:dB)

3.2.6 - wifiConnect

✓ *Command example:*

```

{
  "protocol": {
    "name": "YQ-COM2",
    "version": "1.0",
    "targetpid": "50C811344D45594D4110000008AB53AD",
    "targetbarcode": "C0Y2001805150056",
    "remotefunction": {
      "name": "wifiConnect",
      "input": {
        "ssid": "ChinaNet-8E20",
        "psk": "12345678"
      }
    }
  }
}

```

Parameters:

- ✓ "ssid": hotspot name which need to be connected
- ✓ "psk": hotspot passwords which need to be connected

✓ *Reply example:*

```
{
  "targetpid": "50C811344D45594D4110000012B755AB",
  "targetbarcode": "C0Y2L01805100002",
  "remotefunction": {
    "name": "wifiConnect",
    "networkdevice": "eth0",
    "output": {
      "minwaittime": "3",
      "maxwaittime": "9"
    }
  }
}
```

"wifiConnect" is not real time command, need to inform PC software that how long it will be there as to check executive result:

- ✓ minwaittime: Minimum waiting time for non real time command, unit is seconds;
- ✓ maxwaittime: Maximum waiting time for non real time command, unit is seconds;

If "ssid" and "psk" which are connected is changed, controller will reply by common successful reply format:

```
{
  "targetpid": "50C811344D45594D4110000012B755AB",
  "targetbarcode": "C0Y2L01805100002",
  "remotefunction": {
    "name": "wifiConnect",
    "networkdevice": "eth0"
  }
}
```

3.2.7 - queryWifiStatus

✓ *Command example:*

```
{
  "protocol": {
    "name": "YQ-COM2",
    "version": "1.0",
    "targetpid": "50C811344D45594D4110000008AB53AD",
    "targetbarcode": "C0Y2001805150056",
    "remotefunction": {
      "name": "queryWifiStatus"
    }
  }
}
```

✓ *Reply example:*

```
{
  "targetpid": "50C811344D45594D4110000012B755AB",
  "targetbarcode": "C0Y2L01805100002",
  "remotefunction": {
    "name": "queryWifiStatus",
  }
}
```

```

    "networkdevice": "eth0",
    "output": {
      "wifistatus": "connected"
    }
  }
}

```

Parameters:

- ✓ "wifistatus": connection status of returned WiFi
 - ✓ "associating": associating
 - ✓ "connected": connected
 - ✓ "scanning": scanning
 - ✓ "unconnected": unconnected
 - ✓ "other": other unknown status

3.2.8 - wifiDisconnect

✓ *Command example:*

```

{
  "protocol": {
    "name": "YQ-COM2",
    "version": "1.0",
    "targetpid": "50C811344D45594D4110000008AB53AD",
    "targetbarcode": "C0Y2001805150056",
    "remotefunction": {
      "name": "wifiDisconnect"
    }
  }
}

```

3.2.9 - setApAttributes

✓ *Command example:*

```

{
  "protocol": {
    "name": "YQ-COM2",
    "version": "1.0",
    "targetpid": "50C811344D45594D4110000008AB53AD",
    "targetbarcode": "C0Y2001805150056",
    "remotefunction": {
      "name": "setApAttributes",
      "input": {
        "ssid": "BX-Y03_XiZangNanLu",
        "password": "12345678",
        "apipaddress": "192.168.22.100"
      }
    }
  }
}

```

This command is used for modifying hotspot attributes connected for users in WiFi AP mode.

Parameters:

- ✓ "ssid": customized hotspot name, suggest to use ASCII, do not use Chinese; Within 32digits; When "ssid" is blank, means to close WiFi hotspot function
- ✓ "password": customized hotspot passwords, 8~32 digits ASCII
- ✓ "apipaddress": IP address in WiFi AP mode

It will be valid after "restartNetwork" .

3.2.10 - switchServerMode

✓ *Command example:*

```
{
  "protocol": {
    "name": "YQ-COM2",
    "version": "1.0",
    "targetpid": "50C811344D45594D4110000008AB53AD",
    "targetbarcode": "C0Y2001805150056",
    "remotefunction": {
      "name": "switchServerMode",
      "input": {
        "servermode": "off"
      }
    }
  }
}
```

This command is used after set parameters correctly by "setcontroller attributes". Common server mode or encrypted server mode need to be set correctly: "serverip" and "serverport"; Cloud server mode or encrypted server mode need to be set correctly: "cloudip", "cloudport" and "clouduserid"; JTC mode need to be set correctly "jtcproxyhost", "jtcproxyport", "jtcproxymode" and "jtcproxyprotocol". What's more, before start encrypted mode, you need to release TLS certificate in advance.

Parameters:

- ✓ "servermode": server mode which need to be switched
 - ✓ "off"- turn off all server mode
 - ✓ "server" - common server mode
 - ✓ "servertls" - TLS TLS encrypted server mode
 - ✓ "cloud" - cloud server mode
 - ✓ "cloudtls" - TLS encrypted server mode
 - ✓ "jtcproxy" - JTC mode

4. HTTP communication command

HTTP communication command is command format used by HTTP proxy. HTTP proxy send remote command to controller by HTTP protocol, after handled by controller, will return result by HTTP too. HTTP is affiliated with TCP protocol which face to link.

HTTP communication command support both GET and POST, part of command use POST. In the following examples, controller IP address is 192.168.1.19, passwords, verification code are modified, cannot be used directly, only for reference.

4.1 HTTP message example

4.1.1 Obtain checking code message

✓ POST

Request entity:

```
POST / HTTP/1.1
Host: 192.168.0.199
Accept:text/json
Content-Type: application/json;charset=UTF-8
Content-Length: 96
```

```
{"protocol":{"name":"YQ-COM2","version":"1.0", "remotefunction":{"name":"getVerificationCode"}}
```

Controller reply:

```
HTTP/1.1 200 OK
Server: nginx/1.10.1
Date: Tue, 15 May 2018 10:46:25 GMT
Content-Type: application/json
Transfer-Encoding: chunked
Connection: keep-alive
```

```
{"remotefunction": {"name": "getverificationcode", "output": {"verificationcode": "20180515184625583374"}}
```

✓ GET

Request entity:

```
GET /?parameter=%7B%22protocol%22:%7B%22name%22:%22YQ-COM2%22,%22version%22:%221.0%22,%20%22remotefunction%22:%7B%22name%22:%22GetVerificationCode%22%7D%7D%7D HTTP/1.1
```

```
Host: 192.168.1.19
Connection: keep-alive
Cache-Control: max-age=0
Upgrade-Insecure-Requests: 1
User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/66.0.3359.139 Safari/537.36
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/webp,image/apng,*/*;q=0.8
Accept-Encoding: gzip, deflate
Accept-Language: zh-CN,zh;q=0.9
```

Controller reply:

```
HTTP/1.1 200 OK
Server: nginx/1.10.1
Date: Thu, 17 May 2018 01:20:47 GMT
Content-Type: application/json
Transfer-Encoding: chunked
Connection: keep-alive

{"remotefunction": {"name": "getverificationcode", "output": {"verificationcode": "20180517092047470808"}}
```

4.1.2 users log in message

✓ POST

Request entity:

```
POST / HTTP/1.1
Host: 192.168.8.39
Accept:text/json
Content-Type: application/json;charset=UTF-8
Content-Length: 212

{"protocol":{"name":"YQ-COM2","version":"1.0","remotefunction":{"name": "UserLogin","input":{"password":"35c83b5baf44bf36c8340fa87845d8043a46a225","username":"guest","verificationcode":"20180517093429462773"}}}}
```

Controller reply:

```
HTTP/1.1 200 OK
Server: nginx/1.10.1
Date: Thu, 17 May 2018 01:34:29 GMT
Content-Type: application/json
Transfer-Encoding: chunked
Connection: keep-alive

{"remotefunction": {"name": "userlogin", "output": {"sessionID": "71862f05d7dfcd189ce9d78109b9e8a1"}}}
```

✓ GET

Request entity:

```
GET /?parameter=%7B%22protocol%22:%7B%22name%22:%20%22YQ-COM2%22,%22version%22:%20%221.0%22,%22remotefunction%22:%7B%22name%22:%20%22UserLogin%22,%22input%22:%7B%27username%27:%27admin%27,%27verificationcode%27:%2720180323184222719316%27,%27password%27:%274fdd7ce377ef533cb8d8a6048d1c5df3f03c7ce2%27%7D%7D%7D%7D HTTP/1.1
Host: 192.168.8.39
Connection: keep-alive
Upgrade-Insecure-Requests: 1
User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/66.0.3359.139 Safari/537.36
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/webp,image/apng,*/*;q=0.8
Accept-Encoding: gzip, deflate
Accept-Language: zh-CN,zh;q=0.9
```

Controller reply:

```
HTTP/1.1 200 OK
Server: nginx/1.10.1
Date: Thu, 17 May 2018 01:53:03 GMT
Content-Type: application/json
Transfer-Encoding: chunked
Connection: keep-alive

{"remotefunction": {"error": {"code": 27, "mesg": "Verification code error"},
"name": "userlogin"}}
```

4.1.3 Correct time message

✓ POST

Request entity (characters after stok is returned "sessionID" after log in command successfully:

```
POST /;stok=71862f05d7dfcd189ce9d78109b9e8a1/ HTTP/1.1
Host: 192.168.8.39
Accept:text/json
Content-Type: application/json;charset=UTF-8
Content-Length: 139

{"protocol":{"name":"YQ-COM2","version":"1.0","remotefunction":{"name": "SystemClockCorrect","input":{"datetime":"2018-05-17 12:35:18"}}}}
```

Controller reply:

```
HTTP/1.1 200 OK
Server: nginx/1.10.1
Date: Thu, 17 May 2018 04:35:18 GMT
Content-Type: application/json
Transfer-Encoding: chunked
Connection: keep-alive

{"remotefunction": {"name": "systemclockcorrect"}}
```

✓ GET

Request entity:

```
GET /;stok=372267c68435e4ea61150cb752fcbac4/?parameter=%20%0A%0A%7B%22protocol%22:%20%22YQ-COM2%22,%22version%22:%20%221.0%22,%22clienttype%22:%20%22PC%22,%22remotefunction%22:%20%22systemClockCorrect%22,%22input%22:%20%22datetime%22:%20%22018-05-17%2012:43:00%22%7D%7D%7D%7D%0A HTTP/1.1
Host: 192.168.8.39
Connection: keep-alive
Upgrade-Insecure-Requests: 1
User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/66.0.3359.139 Safari/537.36
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/webp,image/apng,*/*;q=0.8
Accept-Encoding: gzip, deflate
Accept-Language: zh-CN,zh;q=0.9
```

4.1.4 Upload file message

- ✓ Upload common file (excluding real command)

Request entity (URI route is /upload):

```
POST /upload HTTP/1.1
Content-Type: multipart/form-data; boundary=-----866009359719137606378166
Accept: text/json
accept-encoding: gzip, deflate
content-length: 223019

-----866009359719137606378166
Content-Disposition: form-data; name="409b24bb8fb7f03d76908852c9f105d0.bmp"; filename="testPic1.bmp"
Content-Type: image/bmp

BM6.....6...(.....`..... .... (full file content)
-----866009359719137606378166
Content-Disposition: form-data; name="0bb856e65ec7a08cc12a7d791c8be271.bmp"; filename="testPic2.bmp"
Content-Type: image/bmp

BM8.....6... (full file content)
-----866009359719137606378166--
```

Controller reply:

```
HTTP/1.1 200 OK
Server: nginx/1.10.1
Date: Thu, 25 Oct 2018 05:32:35 GMT
Content-Type: application/json
Transfer-Encoding: chunked
Connection: keep-alive
```

Upload OK

- ✓ Upload dynamic area file (dynamic area file is included in "command": update displaying dynamic area command or update dynamic area material command)

Request entity (URI route is /dynamic;/stok=valid sessionID):

```
POST /dynamic;/stok=372267c68435e4ea61150cb752fcbac4 HTTP/1.1
Content-Type: multipart/form-data; boundary=-----866009359719137606378166
Accept: text/json
accept-encoding: gzip, deflate
content-length: 223019

-----866009359719137606378166
Content-Disposition: form-data; name="409b24bb8fb7f03d76908852c9f105d0.bmp"; filename="testPic1.bmp"
Content-Type: image/bmp

BM6.....6...(.....`..... .... (完整文件内容 full file content)
-----866009359719137606378166
```



```
Content-Disposition: form-data; name="0bb856e65ec7a08cc12a7d791c8be271.bmp"; filename="testPic2.bmp"
Content-Type: image/bmp
```

```
BM8.....6... (full file content)
```

```
-----866009359719137606378166
```

```
Content-Disposition: form-data; name="command"
```

```
{"protocol":{"name": "YQ-COM2", "version": "1.0", "remotefunction":{"name": "UpdateDynamic", "input": {"immediatelyPlay": "0", "cover": "0", "dynamics": [{"id": "0", "xCoord": "0", "yCoord": "0", "width": "128", "height": "96", "transparency": "100", "relativeProgram": "", "runMode": "0", "updateFrequency": "10", "unit": [{"type": "Picture", "command": "0", "stuntType": "1", "stuntSpeed": "1", "stayTime": "5", "content": "409b24bb8fb7f03d76908852c9f105d0.bmp", "gifFlag": "0"}, {"type": "Picture", "command": "1", "stuntType": "1", "stuntSpeed": "1", "stayTime": "5", "content": "0bb856e65ec7a08cc12a7d791c8be271.bmp", "gifFlag": "0"}]}]}}}
```

```
-----866009359719137606378166--
```

Controller reply:

```
HTTP/1.1 200 OK
```

```
Server: nginx/1.10.1
```

```
Date: Thu, 25 Oct 2018 05:32:35 GMT
```

```
Content-Type: application/json
```

```
Transfer-Encoding: chunked
```

```
Connection: keep-alive
```

```
{"remotefunction": {"name": "updatedynamic"}}
```

Note: when you named for file, must obey the rules, please check Appendix 7.

4.2 User management

4.2.1 - getVerificationCode

✓ *Command example:*

```
{
  "protocol": {
    "name": "YQ-COM2","version": "1.0",
    "remotefunction": {
      "name": "getVerificationCode",
      "input": {
        "username": "guest"
      }
    }
  }
}
```

✓ *Reply example:*

```
{
  "remotefunction": {
    "name": "getVerificationCode",
    "output": {
      "verificationcode": "20180515184625583374"
    }
  }
}
```

"verificationcode" is character related with time, which is created by controller, used for following login command.

4.2.2 - userLogin

✓ *Command example:*

```
{
  "protocol": {
    "name": "YQ-COM2","version": "1.0",
    "remotefunction": {
      "name": "userLogin",
      "input": {
        "username": "guest",
        "verificationcode": "20180515184625583374",
        "password": "ece10bbcd940ef4356e6d6f61cc6525c7924bab6"
      }
    }
  }
}
```

Parameters:

- ✓ "username": login user name, only "guest"
- ✓ "verificationcode": must be verification code which is obtained by "obtainverificationcode" command, before use "loginusername" command, you must use "obtainverificationcode" in advance.

- ✓ "password": is the result spliced by "verificationcode" value and username passwords SHA1 code and then calculated by SHA1. Result by Joint of "verificationcode" value and SHA1 code of login password.

- ✓ *Reply example:*

```
{
  "remotefunction": {
    "name": "userLogin",
    "output": {
      "sessionID": "5029f6bcfb12e969ceec02bd633d269d7"
    }
  }
}
```

"sessionID" returned value, used for other command route.

4.2.3 - userLogout

- ✓ *Command example:*

```
{
  "protocol": {
    "name": "YQ-COM2", "version": "1.0",
    "remotefunction": {
      "name": "userLogout",
      "input": {
        "username": "guest"
      }
    }
  }
}
```

4.2.4 - changePassword

- ✓ *Command example:*

```
{
  "protocol": {
    "name": "YQ-COM2", "version": "1.0",
    "remotefunction": {
      "name": "changePassword",
      "input": {
        "username": "guest",
        "password1": "SHA1 value",
        "password2": "verification code"
      }
    }
  }
}
```

If you modified passwords, please note it by yourself. If you lost the passwords, you will not be able to use the controller. Or you need to reset to factory.

Parameters:

- ✓ "username": user name for modify passwords (now only guest)
- ✓ "password1": SHA1 encrypted value for new passwords
- ✓ "password2": Do base64 coding for encrypted value "password1" of SHA1 for new passwords.

4.3 Maintenance of controller

4.3.1 - reboot

✓ *Command example:*

```
{
  "protocol": {
    "name": "YQ-COM2", "version": "1.0",
    "remotefunction": {
      "name": "reboot"
    }
  }
}
```

✓ *Reply example:*

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

4.3.2 - restartApp

✓ *Command example:*

```
{
  "protocol": {
    "name": "YQ-COM2", "version": "1.0",
    "remotefunction": {
      "name": "restartApp"
    }
  }
}
```

4.3.3 - systemClockCorrect

✓ *Command example:*

```
{
  "protocol": {
    "name": "YQ-COM2", "version": "1.0",
    "remotefunction": {
      "name": "systemClockCorrect"
      "input": {
        "datetime": "2018-5-15 13:59:59",
        "isutc": "yes"
      }
    }
  }
}
```

Parameters:

- ✓ "datetime": Same format with "date" command of setting system time in Linux, like "yyyy-MM-dd hh:mm:ss"
- ✓ "isutc": Correct controller time by UTC or not. "yes": by UTC, "no": by local time.

4.3.4 - setLanguage

✓ *Command example:*

```
{
  "protocol": {
    "name": "YQ-COM2", "version": "1.0",
    "remotefunction": {
      "name": "setLanguage"
      "input": {
        "language": "zh_CN"
      }
    }
  }
}
```

Parameters:

- ✓ "language": Language, check Appendix 8.

✓ *Wrong reply example:*

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

4.3.5 - screenOnOff

✓ *Command example:*

```
{
  "protocol": {
    "name": "YQ-COM2", "version": "1.0",
    "remotefunction": {
      "name": "screenOnOff"
      "input": {
        "screenonoffstatus": "on"
      }
    }
  }
}
```

Parameters:

- ✓ "screenonoffstatus": "on" or 1 - turn on, "off" or 0 - turn off

4.3.6 - customScreenOnOff

✓ *Command example:*

```
{
  "protocol": {
    "name": "YQ-COM2", "version": "1.0",
    "remotefunction": {
      "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"
        }
      ]
    }
  }
}
```

Parameters:

- ✓ "starttime": Time node by "hh:mm:ss" format
- ✓ "action": "on" or 1 - turn on, "off" or 0 - turn off

This command support maximum 8 groups.

4.3.7 - cancelCustomScreenOnOff

✓ *Command example:*

```
{
  "protocol": {
    "name": "YQ-COM2", "version": "1.0",
    "remotefunction": {
      "name": "cancelCustomScreenOnOff"
    }
  }
}
```

4.3.8 - setScreenSize

✓ *Command example:*

```
{
  "protocol": {
    "name": "YQ-COM2", "version": "1.0",
    "remotefunction": {
      "name": "setScreenSize"
      "input": {
```

```

        "width": "1280",
        "height": "720"
    }
}
}
}

```

Default for "foldtype" command is "0"

4.3.9 - setVolume

✓ *Command example:*

```

{
  "protocol": {
    "name": "YQ-COM2", "version": "1.0",
    "remotefunction": {
      "name": "setVolume"
      "input": {
        "volume": "50"
      }
    }
  }
}
}

```

Parameters:

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

4.3.10 - setOutputType

✓ *Command example:*

```

{
  "protocol": {
    "name": "YQ-COM2", "version": "1.0",
    "remotefunction": {
      "name": "setOutputType"
      "input": {
        "outputtype": "LCD"
      }
    }
  }
}
}

```

BX-Y series do not support switching output type.

Parameters:

✓ "outputtype": Output type, "LCD" or "DVI"("HDMI")

4.3.11 - setTimeZoneServer

✓ *Command example:*

```

{
  "protocol": {
    "name": "YQ-COM2", "version": "1.0",
    "remotefunction": {

```



```

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

```

Parameters:

- ✓ "timezoneflag": "on" or 1 - can, "off" or 0 - close
- ✓ "timezoneserver": Set time server IP address which is valid. Users can set several IP at the same time, separate it by “,”. If this parameter is blank “ ”, it will use default time server (0.pool.ntp.org, 1.pool.ntp.org, 2.pool.ntp.org, 3.pool.ntp.org)
- ✓ "timezone": When you set time zone of controller, if this parameter is blank “ ”, use default zone “Asia/Shanghai”.

4.3.12 - systemBrightness

✓ Command example:

```

{
  "protocol": {
    "name": "YQ-COM2", "version": "1.0",
    "remotefunction": {
      "name": "systemBrightness"
      "input": {
        "brightness": "255",
        "changemode": "yes"
      }
    }
  }
}

```

Parameters:

- ✓ "brightness": Adjust brightness value, from 1~255, 244 is the brightest
- ✓ "changemode": Change brightness mode or not. “yes”-modify brightness mode to manual brightness at the same time; “no” - adjust brightness temporarily, do not modify the former brightness mode. Default is “yes”.

4.3.13 - customBrightness

✓ Command example:

```

{
  "protocol": {
    "name": "YQ-COM2", "version": "1.0",
    "remotefunction": {
      "name": "customBrightness"
      "input": {
        "items":["1","2","3",..., "48"]
      }
    }
  }
}

```

```

    }
  }
}

```

Parameters:

- ✓ "items": 48 ranges 1~255 brightness value, for the whole day 48.5 hours.

4.3.14 - autoBrightness

✓ *Command example:*

```

{
  "protocol": {
    "name": "YQ-COM2","version": "1.0",
    "remotefunction": {
      "name": "autoBrightness"
      "input": {
        "brightnessValue": ["1","1","2", ... ,"255"],
        "sensorValue": ["2","100","600", ... ,"65535"],
        "sensorAddress": "0x8000"
      }
    }
  }
}

```

Parameters:

- ✓ "sensorValue": 16 ranges 0~65535 sensor value, for 16 threshold values.
- ✓ "brightnessValue": 16 ranges 1~255 value, for 16 brightness adjusting values.
- ✓ "sensorAddress": Check Appendix 5; Except addresses in multi-function card are available, on-board I²C brightness sensor 0*823 is also available. Check Appendix 5.

4.3.15 - getAttributes

✓ *Command example:*

```

{
  "protocol": {
    "name": "YQ-COM2","version": "1.0",
    "remotefunction": {
      "name": "getAttributes"
      "input": {
        "controllertype": "",
        "screenonoffstatus": "",
        "firmwareversion": ""
      }
    }
  }
}

```

It is checking command, sub-key in "input" is the attributes you need to check (their "value" are blank, number is changeable. Please check Appendix 1.

✓ *Reply example:*

```

{
  "remotefunction": {
    "name": "getAttributes",

```

```

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

```

Return to all checking parameters value, if there's parameter which is not exist, the command will be failed, return error info.

4.3.16 - setAttributes

✓ *Command example:*

```

{
  "protocol": {
    "name": "YQ-COM2", "version": "1.0",
    "remotefunction": {
      "name": "setAttributes",
      "input": {
        "controllername": "test",
        "ipflag": "on/off",
        "serverip": "192.168.88.123",
        "serverport": "16800"
      }
    }
  }
}

```

Please check Appendix 1. Users can set by this command only there's "setAttributes".

4.3.17 - getState

✓ *Command example:*

```

{
  "protocol": {
    "name": "YQ-COM2", "version": "1.0",
    "remotefunction": {
      "name": "getState",
      "input": {
        "rtctime": "",
        "gps": {
          "longitude": "",
          "latitude": "",
          "altitude": "",
          "angle": "",
          "speed": ""
        }
      }
    }
  }
}

```

Parameters:

✓ "rtctime": Return RTC time.

- ✓ "gps": Return GPS info.

It is checking command, used to check the present status of controller which is running. Sub-key in "input" is the attributes which need to be checked (their "value" is blank), number is changeable. Presently, support "rtctime" and "GPS".

- ✓ *Reply example:*

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

Parameters:

- ✓ "rtctime": RTC time.
- ✓ "gps": GPS info. Including:
 - ✓ "longitude": longitude, E/Wdddmm.mmmmmm.
 - ✓ "latitude": latitude, N/Sddmm.mmmmmm.
 - ✓ "altitude": altitude. Range -9999.9 ~ 99999.9M.
 - ✓ "angle": angle. Range 0.0° ~ 359.9°。
 - ✓ "speed": speed. Unit: km/h.

4.3.18 updateFirmware

- ✓ *Command example:*

```
{
  "protocol": {
    "name": "YQ-COM2", "version": "1.0",
    "remotefunction": {
      "name": "updateFirmware",
      "input": {
        "firmwarepath": "backup/BX-Y3_V18051400.bxf"
      }
    }
  }
}
```

Update controller with correct firmware. Before use this command, need to upload file or use command "download file from URL", upload firmware to "share" of controller (do not use "update" directly), then "firmwarepath".

4.3.19 - restoreFactory

✓ *Command example:*

```
{
  "protocol": {
    "name": "YQ-COM2", "version": "1.0",
    "remotefunction": {
      "name": "restoreFactory",
      "input": {
        "saveconfig": "yes"
      }
    }
  }
}
```

Use for reset to factory.

Parameters:

- ✓ "saveconfig": Save configuration file or not. "yes": save; default is save.

✓ *Reply example:*

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

Parameters:

- ✓ "minwaittime": Minimum waiting time.
- ✓ "maxwaittime": Maximum waiting time.

4.4 Disks

4.4.1 - queryDiskList

✓ *Command example:*

```
{
  "protocol": {
    "name": "YQ-COM2", "version": "1.0",
    "remotefunction": {
      "name": "queryDiskList"
    }
  }
}
```

✓ *Reply example:*

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

Note: numbers of element in returned “items” is decided by controller, if it is blank, means controller is in error. “emmc”, “sd”, “usb1” are supported by controller.

4.4.2 - queryDisk

✓ *Command example:*

```
{
  "protocol": {
    "name": "YQ-COM2", "version": "1.0",
    "remotefunction": {
      "name": "queryDisk"
      "input": {
        "storagemedia": "emmc"
      }
    }
  }
}
```

✓ *Reply example:*

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

```
}
```

Parameters:

- ✓ "totalsize": Total storage, unit is byte.
- ✓ "usedsize": used storage
- ✓ "freesize": free storage
- ✓ "usedpercent": used percent.
- ✓ "filesystem": file system type, like ext4, vfat, etc.

4.4.3 - setStorageMedia

✓ *Command example:*

```
{
  "protocol": {
    "name": "YQ-COM2", "version": "1.0",
    "remotefunction": {
      "name": "setStorageMedia"
      "input": {
        "storagemedia": "emmc"
      }
    }
  }
}
```

4.5 Files

4.5.1 - enableUploadDownload

✓ *Command example:*

```
{
  "protocol": {
    "name": "YQ-COM2", "version": "1.0",
    "remotefunction": {
      "name": "enableUploadDownload",
      "input": {
        "type": "upload",
        "flag": "on"
      }
    }
  }
}
```

Parameters:

- ✓ "type": type, "upload" - upload, "download" - download
- ✓ "flag": "on" or 1 - turn on, "off" or 0 - turn off

Example:

- ✓ { "type":"upload","flag":"on"} : Open uploading channel for files
- ✓ { "type":"download","flag":"off"} : Close uploading channel for files

Process for uploading files, please check 5.2:

- 1) Open uploading channel for files (default is close)
- 2) Upload file by HTTP POST, URL route for uploading:
[http://controller IP\[:controller port 80\]/upload](http://controller IP[:controller port 80]/upload)
- 3) Close channel after finish uploading

Process for downloading files:

- 1) Open downloading channel for files (default is close)
- 2) Downlod file by HTTP GET, URL route for uploading:
[http://controller IP\[:controller port 80\]/download/\[file route\]](http://controller IP[:controller port 80]/download/[file route])
- 3) Close channel after finishing downloading

Open downloading channel, input [http://controller IP\[:controller port 80\]/download](http://controller IP[:controller port 80]/download) in browser, then, users can check route of controller.

4.5.2 - findTempFile

✓ *Command example:*

```
{
  "protocol": {
    "name": "YQ-COM2", "version": "1.0",
    "remotefunction": {
      "name": "findTempFile",
      "input": {
        "filename": "123.jpg"
      }
    }
  }
}
```



```
}

```

✓ *Reply example:*

```
{
  "remotefunction": {
    "name": "findTempFile",
    "output": {
      "filename": " 123.jpg",
      "size": "125688"
    }
  }
}
```

If "size" is 0, means file is not exist or file size is 0.

4.5.3 - findFile

✓ *Command example:*

```
{
  "protocol": {
    "name": "YQ-COM2", "version": "1.0",
    "remotefunction": {
      "name": "findFile",
      "input": {
        "items": [
          {
            "filename": "share/123.jpg"
          },
          {
            "filename": "lists/plist1.xml"
          }
        ]
      }
    }
  }
}
```

✓ *Reply example:*

```
{
  "remotefunction": {
    "name": "FindFile",
    "output": {
      "items": [
        {
          "filename": "share/123.jpg",
          "mtime": "2018-3-20 13:02:12",
          "size": "125688"
        },
        {
          "filename": "lists/plist1.xml",
          "mtime": "",
          "size": "0"
        }
      ]
    }
  }
}
```

```
}
}
```

- ✓ "size": size of file
- ✓ "mtime": The last date for modifying file, if it is blank, means file is not exist.

4.5.4 - moveFile

- ✓ *Command example:*

```
{
  "protocol": {
    "name": "YQ-COM2", "version": "1.0",
    "remotefunction": {
      "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 original file to destination, can be renamed. If original file does not have route, just file name, then, default is move the file which is uploaded temporarily to destination.

After open "file authentication", move file, need to add number signature info and signature certificate of moving file.

- ✓ "src": Original route. If it is including only file (do not have route), then, default is the route of "temporarily upload catalog".
- ✓ "dst": Destination route of moving file.
- ✓ "signature": BASE64 code for digest content to do number signature
- ✓ "digest": Digest calculate: "sha1", "md5", default is "sha1"
- ✓ "offset": offset for start and end location of digest content, default is "0"
- ✓ "length": Length for digest content, default is the length after "offset". Range for length ≥ 1 mb and ≤ 8 MB. If the file ≤ 1 MB, should get the whole file length.
- ✓ "fingerprint": Signature certificate fingerprint of SHA1

Do not use this command to modify the specialized catalog name.

4.5.5 - copyFile

- ✓ *Command example:*

```
{
  "protocol": {
    "name": "YQ-COM2", "version": "1.0",
    "remotefunction": {
      "name": "copyFile",
      "input": {
        "src": "backup/file1.txt",
        "dst": "share/file2.txt"
      }
    }
  }
}
```

Copy original file to destination. If there's no route in original file, only file name, then the default is copy file of temporarily uploading catalog to destination.

4.5.6 - deleteFile

✓ *Command example:*

```
{
  "protocol": {
    "name": "YQ-COM2", "version": "1.0",
    "remotefunction": {
      "name": "deleteFile",
      "input": {
        "items": [
          "123.jpg",
          "lists/plist1.xml"
        ]
      }
    }
  }
}
```

Delete specified file of "items". If there's no route in file name, only file name, then delete file in temporarily uploading catalog.

4.5.7 - downloadFileFromURL

✓ *Command example:*

```
{
  "protocol": {
    "name": "YQ-COM2", "version": "1.0",
    "remotefunction": {
      "name": "downloadFileFromURL",
      "input": {
        "failonwaitingtimeout": "10",
        "downloadmode": "queue",
        "downloadtimes": "1",
        "updatetime": "0",
        "items": [
          {

```


- ✓ "failonwaitingtimeout": Overtime, unit is seconds. If the time is out, and downloading tax is still in waiting and it will be in downloading failed status; Set 0 as to close this function, tax will be in waiting until downloading successfully or be canceled.
- ✓ "updatetime": "downloadtimes" "failonwaitingtimeout" Interval time between twice downloads when it is downloaded repeatedly; "downloadtimes" is valid when it is not 1, need to >"failonwaitingtimeout".

✓ *Reply example*

```
{
  "remotefunction": {
    "name": "downloadFileFromURL",
    "output": {
      "id": "id" "downloading tax id"
    }
  }
}
```

Return "id" is to check following schedules, delete tax, etc.

4.5.8 - queryDownloadProgress

✓ *Command examples:*

```
{
  "protocol": {
    "name": "YQ-COM2", "version": "1.0",
    "remotefunction": {
      "name": "queryDownloadProgress",
      "input": {
        "id": "id" "downloading tax id"
      }
    }
  }
}
```

"download file from URL" return <tax id>.

✓ *Reply example*

```
{
  "remotefunction": {
    "name": "queryDownloadProgress",
    "output": {
      "id": "<id>", "<tax id>",
      "status": "failure",
      "rate": "10",
      "errorinfo": [
        {
          "url": "<url>", "<error in downloading url>",
          "message": "<>" "<error information>",
        },
        {
          "url": "<url>", "<error in downloading url>",
          "message": "<error information>"
        }
      ]
    }
  }
}
```

```

    }
  }
}

```

Parameters:

- ✓ "id": id tax id
- ✓ "status": downloading status
 - ✓ "waiting": waiting for downloading
 - ✓ "downloading": downloading
 - ✓ "complete": completed
 - ✓ "failure": failed
 - ✓ "notfound": <tax id> tax is not existed
- ✓ "rate": 0~1000 downloading %.
- ✓ "errorinfo": "status" "failure"
 - ✓ "url": url error info, "status" is existed when it's "failure".
 - ✓ "message": error message

4.5.9 - cancelDownload

✓ *Command example*

```

{
  "protocol": {
    "name": "YQ-COM2", "version": "1.0",
    "remotefunction": {
      "name": "cancelDownload",
      "input": {
        "id": "tax id"
      }
    }
  }
}

```

Cancel "id" tax. When "id" is blank, delete all downloading tax. Please be careful.

4.5.10 - uploadFileToFtpServer

✓ *Command example*

```

{
  "protocol": {
    "name": "YQ-COM2", "version": "1.0",
    "remotefunction": {
      "name": "uploadFileToFtpServer",
      "input": {
        "host": "192.168.88.222",
        "port": "21",
        "user": "guest",
        "password": "guest",
        "srcfile": "share/example.bmp",
        "dstfile": "exampledir/exampleDst.bmp"
      }
    }
  }
}

```

```
    }  
  }  
}
```

Parameters

- ✓ "host": FTP server host, can be domain name, but on condition that controller has been set for domain name server
- ✓ "port": FTP server port, default is 21
- ✓ "user": username
- ✓ "password": password
- ✓ "srcfile": file name of user catalog in controller
- ✓ "dstfile": valid route in server, if there's no file name (end by '/'), then use original file name

✓ *Reply example*

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

Parameters

- ✓ "size": file size of controller, it may be changed.

4.6 Programs

4.6.1 - play

✓ Command example

```
{
  "protocol": {
    "name": "YQ-COM2", "version": "1.0",
    "remotefunction": {
      "name": "play",
      "input": {
        "type": "program",
        "playlist": "lists/plist1.xml"
      }
    }
  }
}
```

Parameters

- ✓ "type": Program type which is going to display, can be "program"-common program, "bulletin"-bulletin program, "dynamic"-dynamic program which is saved(controller will delete all dynamic areas which are playing), and can be "all"-all programs, including common programs, bulletin programs and dynamic programs which are saved. There's command for bulletin "play bulletin". Dynamic area playing use command "update playing dynamic area".
- ✓ "playlist": Only for common program "program"; If it is blank, controller will search playing list automatically.

Common program, bulletin program and dynamic program should be played singly, these three are not influenced if they are not related.

This command can only play the dynamic areas which are saved, and delete all dynamic areas at the same time which are playing.

After restart controller, it will automatically play common program, undeleted ("delete bulletin" command) bulletin, and dynamic areas("save dynamic area file" command) which are saved in "playlist".

✓ Reply example:

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

✓ Error reply example:

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


}

4.6.2 - stopPlay

✓ *Command example*

```
{
  "protocol": {
    "name": "YQ-COM2", "version": "1.0",
    "remotefunction": {
      "name": "stopPlay",
      "input": {
        "type": "program",
      }
    }
  }
}
```

Parameters

- ✓ "type": Program type which is stopped, can be "program"-common program, "bulletin"-bulletin program, "dynamic"-dynamic program which is saved(controller will delete all dynamic areas which are playing), and can be "all"-all programs, including common programs, bulletin programs and dynamic programs which are saved. There's command for bulletin "play bulletin". Dynamic area playing use command "update playing dynamic area".

Common program, bulletin program and dynamic program should be played singly, these three are not influenced if they are not related.

This command can only play the dynamic areas which are saved, and delete all dynamic areas at the same time which are playing.

✓ *Reply example:*

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

✓ *Error reply example:*

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

4.6.3 - lockProgram

✓ *Command example:*

```
{
  "protocol": {
    "name": "YQ-COM2", "version": "1.0",
    "remotefunction": {
      "name": "lockProgram",
      "input": {
        "programlockedstatus": "on",
        "programlockedname": "program_0"
      }
    }
  }
}
```

This command is only for common program.

Parameter

- ✓ "programlockedstatus": "lock" 1 - "unlock" 0 -
- ✓ "programlockedname": Program name, by "name" attribute

✓ *Reply example*

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

Parameters

- ✓ "type": "programlockedstatus", true - lock, false - unlock for "programlockedstatus", true - lock, false - unlock.

✓ *Error reply example*

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

4.6.4 - checkPlayer

✓ *Command example*

```
{
  "protocol": {
    "name": "YQ-COM2", "version": "1.0",
    "remotefunction": {
      "name": "checkPlayer"
    }
  }
}
```

}

✓ *Reply example*

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

Parameters

- ✓ "programlist": Presently playing file list
- ✓ "insertlist": When it is playing insert file, it will return to present insert file list
- ✓ "programname": presently playing program file
- ✓ "playstatus": "Lock" "Unlock" lock status of present program, "Lock" or "Unlock"

4.6.5 - clearUselessMaterial

✓ *Command example:*

```
{
  "protocol": {
    "name": "YQ-COM2", "version": "1.0",
    "remotefunction": {
      "name": "clearUselessMaterial"
    }
  }
}
```

Delete all playing file lists program files and material files which are not related with present playing file list. And if controller is not playing now, it will delete all play file lists, program files and material files. This command only influences files in lists, programs and share catalog. **So, better to put files in these three catalogs**

4.6.6 - clearAllProgram

✓ *Command example*

```
{
  "protocol": {
    "name": "YQ-COM2", "version": "1.0",
    "remotefunction": {
      "name": "clearAllProgram",
      "input": {
        "keepmaterial": "yes"
      }
    }
  }
}
```

```

    }
  }
}

```

Parameters

- ✓ "keepmaterial": "yes":keep,"no": don't keep.KEEP mark. "yes": keep, "no": don't keep.

This command usesto stop all playing programs, and deletes all playing lists and program materials (optional).

4.6.7 - insertList

✓ *Command example*

```

{
  "protocol": {
    "name": "YQ-COM2","version": "1.0",
    "remotefunction": {
      "name": "insertList",
      "input": {
        "playlist":"/lists/a.xml",
        "count":"0",
        "duration":"180"
      }
    }
  }
}

```

Parameters

- ✓ "playlist": Users need to upload to controller in advance for the program file list you need to insert; If "playlist" is blank, means to delete the insert files.
- ✓ "count": Playing times of all programs in program list.
- ✓ "duration": Playing time of all programs in program list, it's valid when "count" is 0.

Additional:

- ✓ Inserted program list, ignore priority of all programs.
- ✓ Inserted program list, ignore time-effect attributes in all programs.
- ✓ Inserted program list, ignore carousel attributes in all programs; All programs play one by one by "count" and "duration".
- ✓ Play inserted program immediately, meanwhile stop playing all dynamic areas; In insert playing period, IR controller is not workable; Until finish playing for inserted programs.

4.6.8 - stopInsertList

✓ *Command example*

```

{
  "protocol": {
    "name": "YQ-COM2","version": "1.0",
    "remotefunction": {
      "name": "stopInsertList"
    }
  }
}

```

```
}  
}  
}
```

4.6.9 - switchplayermode

✓ *Command example*

```
{  
  "protocol": {  
    "name": "YQ-COM2", "version": "1.0",  
    "remotefunction": {  
      "name": "switchplayermode",  
      "input": {  
        "playermode": "common"  
      }  
    }  
  }  
}
```

Parameters

- ✓ "playermode": Play mode. "common/0": Asynchronous mode, "sync/1": synchronous mode.

Additional:

- ✓ Presently only BX-Y5E support this command, other types will reply error if receive this command.
- ✓ (Play、UpdateDynamic、UpdateDynamicUnits), In synchronous mode, shield playing command of asynchronous program (Play, UpdateDynamic, UpdateDynamicUnits), reply error.
In synchronous mode, do not support play and upload program by U disk.

4.7 Font

4.7.1 - queryFont

✓ Command example

```
{
  "protocol": {
    "name": "YQ-COM2", "version": "1.0",
    "remotefunction": {
      "name": "queryFont"
    }
  }
}
```

✓ Reply example

```
{
  "remotefunction": {
    "name": "queryFont",
    "output": {
      "systemfont": [
        {
          "fontname": [
            {
              "family": "Simsun",
              "familylang": "en"
            },
            {
              "family": "Simsun",
              "familylang": "zh-cn"
            }
          ]
        },
        {
          "fontstyle": [
            {
              "style": "Regular",
              "stylelang": "en"
            },
            {
              "style": "regular",
              "stylelang": "ca"
            }
          ]
        }
      ],
      "fontname": [
        {
          "family": "SimHei",
          "familylang": "en"
        },
        {
          "family": "SimHei",
          "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": "Common",
            "stylelang": "ca"
          }
        ]
      },
      {
        "fontname": [
          {
            "family": "fontname2_en",
            "familylang": "en"
          },
          {
            "family": "fontname2_zh",
            "familylang": "zh-cn"
          }
        ],
        "fontstyle": [
          {
            "style": "Regular",
            "stylelang": "en"
          }
        ]
      }
    ]
  }
}

```

What's returned by "systemfont" is embedded font of controller, cannot be deleted; What's returned by "customfont" is the font installed by customers, can be deleted.

Parameters

- ✓ "fontname": font name
 - ✓ "family": real font name
 - ✓ "familylang": language of font, like "en", "zh-cn", compatible with "family".
- ✓ "fontstyle": font style
 - ✓ "style": style name, like "Regular", "Common", "bold", etc.
 - ✓ "stylelang": language of style name, like "en", "zh-cn".

4.7.2 - installFont

✓ *Command example*

```
{
  "protocol": {
    "name": "YQ-COM2", "version": "1.0",
    "remotefunction": {
      "name": "installFont",
      "input": {
        "items": [
          "fonts/a.ttf",
          "share/b.ttf"
        ]
      }
    }
  }
}
```

Parameters

✓ "items : font file route list of the one you need to install

Need to upload font file to controller in advance, suggest you to use "fonts" catalog. If it's not in "fonts", it will be moved to "fonts" catalog automatically

✓ *Reply example*

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

4.7.3 - queryFontExist

✓ *Command example*

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

✓ *Reply example*

```
{
  "name": "queryFontExist",
  "output": {
```



```

    "items": [
      {
        "fontname": "SimSun",
        "status": "exist"
      },
      {
        "fontname": "SimHei",
        "status": "notfound"
      }
    ]
  }
}

```

Check the font is exist or not, “fontname” is the name you need to check.

- ✓ "fontname": font name you need to check.
- ✓ "status": check result "exist" - exist/installed successfully, "notfound" - checking result, “exist” - exist/installed successfully, “notfound”- not exist.

4.7.4 - deleteFont

✓ *Command example*

```

{
  "protocol": {
    "name": "YQ-COM2", "version": "1.0",
    "remotefunction": {
      "name": "deleteFont",
      "input": {
        "items": [
          "SimSun"
        ]
      }
    }
  }
}

```

Every sub title in “items” is font name, suggest to name it by English. Since there maybe several fonts in each font file, if you delete one font, means will delete the whole font file which has this font. So, all fonts will be deleted in this font file. **(This command is not mature.)**

4.8 Sensors

4.8.1 - listSensorBus

✓ Command example

```
{
  "protocol": {
    "name": "YQ-COM2",
    "version": "1.0",
    "remotefunction": {
      "name": "listSensorBus"
    }
  }
}
```

✓ Reply example

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

This command is used to list bus of all controllers which is installed sensor.

Parameters

✓ "items":

Bus address of installed sensor, please check Appendix 5.

4.8.2 - searchSensor

✓ Command example

```
{
  "protocol": {
    "name": "YQ-COM2",
    "version": "1.0",
    "remotefunction": {
      "name": "searchSensor"
      "input": {
        "sensorBus": [
          "0x8000",
          "0x800"
        ]
      }
    }
  }
}
```

Asynchronous command, need to use with "listSensor".

Parameters

- ✓ "sensorBus": bus list for installed sensors, usually in returned result of "listSensorBus"; If there's "*", check sensor bus which are supported/connected

✓ *Reply example*

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

4.8.3 - listSensor

✓ *Command example*

```
{
  "protocol": {
    "name": "YQ-COM2",
    "version": "1.0",
    "remotefunction": {
      "name": "listSensor"
    }
  }
}
```

✓ *Reply example*

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

Return result of the last "searchSensor" command.

Parameters

- ✓ "sequence": sensor function sequence, check Appedix 6
- ✓ "sensorAddress": sensor address, check Appendix 5
- ✓ "sensorState": sensor is online or not (usually it's online), 0xFF-online, 0x00-not online

- ✓ "value": sensor value, use default configuration if you did not configure before; integer or floating-point type character string

4.8.4 - getSensorState

✓ *Command example*

```
{
  "protocol": {
    "name": "YQ-COM2",
    "version": "1.0",
    "remotefunction": {
      "name": "getSensorState",
      "input": {
        "sequence": "1",
        "sensorAddress": "0x8000"
      }
    }
  }
}
```

✓ *Reply example*

```
{
  "remotefunction": {
    "name": "getSensorState",
    "output": {
      "sequence": "1",
      "sensorAddress": "0x8000",
      "sensorState": "0xFF",
      "value": "12345",
      "level": "23"
    }
  }
}
```

Parameters

- ✓ "sequence": sensor function sequence, check Appedix 6
- ✓ "sensorAddress": sensor address, check Appendix 5
- ✓ "sensorState": sensor is online or not (usually it's online), 0xFF-online, 0x00-not online
- ✓ "value": sensor value, use default configuration if you did not configure before; integer or floating-point type character string
- ✓ "level": brightness level, additional value when "sequence" is "1" (brightness sensor)

4.8.5 - bindRelay

✓ *Command example*

```
{
  "protocol": {
    "name": "YQ-COM2",
    "version": "1.0",
    "remotefunction": {
      "name": "bindRelay",
      "input": {
        "updatetime": "5",
        "sensorList": [

```


4.8.6 - unbindRelay

✓ *Command example*

```
{
  "protocol": {
    "name": "YQ-COM2",
    "version": "1.0",
    "remotefunction": {
      "name": "unbindRelay",
      "input": {
        "sensorList": [
          {
            "sequence": "2",
            "sensorAddress": "0x8000"
          },
          {
            "sequence": "0x03",
            "sensorAddress": "0x8000"
          }
        ]
      }
    }
  }
}
```

Parameters

- ✓ "sensorList": Sensor list which needs to cancel relations with relay, when it is ["*"] , means need to cancel relation with all relays.

4.8.7 - screenOnOffRelay

✓ *Command example*

```
{
  "protocol": {
    "name": "YQ-COM2",
    "version": "1.0",
    "remotefunction": {
      "name": "screenOnOffRelay",
      "input": {
        "relayAddress": "0x8000",
        "relayType": "0",
        "relaySwitch": "0x00ff"
      }
    }
  }
}
```

Parameters

- ✓ "relayAddress": Relay address, same with "sensorAddress", check Appendix 5
0x0100 - external relay of GPIO
0x8000 - #1 relays on the first multi-function card in #1 LAN port
- ✓ "relayType": 1 - 0 - Module controlling type of on-board relay; 1- high level triggered, 0- low level triggered
- ✓ "relaySwitch": 16 digits unsigned integer, one digit for one relay; If it is 0, do not control; If it is 1, for 1 in relay; 0~7 for 8 relays of the first multi-function card in #1 LAN port, 8 and 9 for external relays of GPIO. On-off, can only control these 10 relays.

4.8.8 - controlRelay

✓ *Command example*

```
{
  "protocol": {
    "name": "YQ-COM2",
    "version": "1.0",
    "remotefunction": {
      "name": "controlRelay",
      "input": {
        "mask": "0x00ff",
        "action": "0x00ff"
      }
    }
  }
}
```

Parameters

- ✓ "mask": Relay mask which needs to be controlled, 16 digits unsigned integer, each one matches with one relay. If it is 1, for 1 in relay, or ignore it.
- ✓ 0~7 for 8 relays of the first multi-function card in #1 LAN port, 8 and 9 for external relays of GPIO.
- ✓ "action": Control electrical level of relay which is matched with "mask". It is related to relay type whether it is ON or OFF.

4.9 Bulletin

4.9.1 - createBulletin

✓ *Command example*

```
{
  "protocol": {
    "name": "YQ-COM2", "version": "1.0",
    "remotefunction": {
      "name": "createBulletin"
      "input": {
        "name": "bulletin0",
        "xcoord": "0",
        "ycoord": "0",
        "width": "400",
        "height": "32",
        "command": "0",
        "transparency": "100",
        "layoutMode": "Top",
        "bgColor": "0xFF00FF00",
        "fontName": "SimSun",
        "fontSize": "24",
        "fontColor": "0xFFFF0000",
        "fontAttributes": "common",
        "stuntType": "5",
        "stuntSpeed": "16",

```


}

4.9.3 - deleteBulletin

✓ *Command example*

```
{
  "protocol": {
    "name": "YQ-COM2", "version": "1.0",
    "remotefunction": {
      "name": "deleteBulletin"
      "input": {
        "items": ["0", "1", "8"]
      }
    }
  }
}
```

Delete bulletin is by bulletin number “command”, this command deletes bulletin by “items”, will delete all bulletins when “items” is [“*”].

4.9.4 - stopBulletin

✓ *Command example*

```
{
  "protocol": {
    "name": "YQ-COM2", "version": "1.0",
    "remotefunction": {
      "name": "stopBulletin"
    }
  }
}
```

Stop all bulletin temporarily, it will display again when restart controller.

4.9.5 - queryBulletin

✓ *Command example*

```
{
  "protocol": {
    "name": "YQ-COM2", "version": "1.0",
    "remotefunction": {
      "name": "queryBulletin"
    }
  }
}
```

✓ *Reply example*

```
{
  "remotefunction": {
    "name": "queryBulletin",
    "output": {
      "0": "bulletin1",

```

```

        "1": "bulletin1"
    }
}

```

Return all bulletin numbers and bulletin names (“bulletin number”: “bulletin name”) at present. If there’s no bulletin, reply format is:

```

{
  "remotefunction": {
    "name": "queryBulletin"
  }
}

```

4.9.6 - addVoice

✓ Command example

```

{
  "protocol": {
    "name": "YQ-COM2", "version": "1.0",
    "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"
      }
    }
  }
}

```

Parameters

- ✓ “text”: Text of UTF-8 code
- ✓ “gender”: Gender: “0”/“female”, female voice; “1”/“male”, male voice; default is 0 female voice
- ✓ “speed”: 50 Voice speed: 1~100, 1 is the slowest; default is 50
- ✓ “tone”: Voice tone: 1~100; default is 50
- ✓ “volume”: Volume: 1~100; default is 50
- ✓ “number”: Number voice: 1~3; 0 is numerical value priority, 1 all are numerical value, 2 all are character string, 3 character string priority; Default is numerical value priority
- ✓ “one”: Chinese pronounce of character 1: “0” pronounce yao, “1” pronounce yi; default “0”
- ✓ “basespeed”: Enhancement of voice speed: 1 is common, 2 is double, 4 is fourfold; default is 1
- ✓ “effect”: Voice effect: 0 is none, 1 is far and near, 2 is echo, 3 is robert, 4 is chorus, 5 is underwater, 6 is reverberation, 7 is enigmatic; default is 0
- ✓ “silent”: 1 Silent time when displaying is finished everytime, 1~60, unit is seconds; default is 1

- ✓ “loop”: 1 Loop playback times, 0~100; when it's 0: if this information is the last infor of this list, it will loop playback until it comes with new information; default is 1

Additional:

- ✓ If you need voice function, please confirm with our technical person first for correct controller models.

4.10 Dynamic area

Dynamic area program is temporarily saved, will not save after power off. Dynamic area can be displayed singly as overall program, also can be displayed together with common program. Dynamic area is always displayed in the top. Or you can set transparency of dynamic area as to play other programs.

- ✓ As overall program, dynamic area will display immediately
- ✓ If display with other program, play aging of dynamic area will be according to other program.
- ✓ Timeliness of dynamic area: Dynamic area which is not related to other programs is overall dynamic area, timeliness is always valid. If related, timeliness is according to related program. It can only be displayed when it's in the range of timeliness.
- ✓ If saved dynamic area file, controller will display saved dynamic area according to related program and timeliness.
- ✓ For displaying dynamic area program, use “dynamic area updating” command; If stop displaying, use “delete dynamic area” command.
- ✓ When update dynamic area, “Picture/0” and “Text/1” dynamic area supports two POST method. When dynamic area file is small (less than 30000B), users can do base64 coding and then send by command. When dynamic area file is big, program needs to be uploaded by form, and send by “command”. Command format in form is same with POST command format, the only difference is that “content” of each “unit” in form is File Save As Name of form uploaded file.

4.10.1 - updateDynamic

- ✓ *Command example*

```
{
  "protocol": {
    "name": "YQ-COM2", "version": "1.0",
    "remotefunction": {
      "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",
```

```

        "command": "0",
        "stuntType": "1",
        "stuntSpeed": "1",
        "stayTime": "5",
        "content": "Qk2mZAAA...",
        "gifFlag": "0",
        "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"
    },{
        "type": "Picture",
        "command": "5",
        "stuntType": "1",
        "stuntSpeed": "1",
        "stayTime": "5",
        "content": "c2hhcmUvN2VlZGY0OTA0ZGY3OGM2NjQzZWMzMMA2ZTJ
mZTc1YmYuYm1w ",
        "flexible": "local",
        "gifFlag": "0"
    },{
        "type": "Text",
        "command": "1",
        "stuntType": "1",
        "stuntSpeed": "1",
        "stayTime": "5",
        "content": "5paH5a2X",
        "bgColor": "0xFF00FF00",
        "fontSize": "16",
        "fontName": "SimSun",
        "fontSizeType": "0",
        "fontColor": "0xFFFF0000",
        "alignment-H": "0",
        "alignment-V": "0",
        "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"
    },{
        "type": "Video",
        "command": "2",
        "scaleMode": "Window",
        "volume": "70",
        "rotationMode": "0"
        "content": "ZnRwOi...",
        "signature": "Rd+f ... ew==",
        "digest": "sha1",
        "offset": "0",
        "length": "1024",

```


Attributes		Specification	
dynamic	xCoord	X coordinate	
	yCoord	Y coordinate	
	width	Width, cannot > screen sized you already set	
	height	Height, cannot > screen sized you already set	
	transparency	Transparency (0-100)	
	id	Dynamic ID, range 0~31 (maximum supports 32 dynamic areas)	
	relativeProgram	Relative program, program numbers (command in program list ("0", "1",...)). If it's blank, no relative program, dynamic area is overall program. If relative common program is not existed, or relative common program is invalid, it is overall program.	
	runMode	Dynamic area running method: "0": Overall play dynamic area, all unit play cyclically "1": Overall play dynamic area program, all unit play cyclically, after play once, will stop play "2": Overall dynamic area program, all unit play orderly, after play once, will play the last unit statically "3": Bind play dynamic area, play dynamic area when it starts to play relative program, all unit cyclically play according to command, until finish playing of relative program "4": Bind play dynamic area, play dynamic area when it starts to play relative program, all unit orderly play, after play once, it will not be played again. "5": Bind play dynamic area, play dynamic area when it starts to play relative program, all unit orderly play, after play once, it will play the last dynamic area statically. "6": Inter play dynamic area, play dynamic area when it starts to play relative program, all unit orderly play and won't play again, continue to play programs after relative program. Note: I : If you do not relate any common programs, use 0, 1, 2; Appointed relative program, use 3, 4, 5, 6, other numbers are invalid. II : 3, 4, 5, 6 runMode use for dynamic area to relate common program, play mode of dynamic area, dynamic area joins to loop playback of relative program	
	updateFrequency	Update frequency of URLPicture、URLText materials, unit is seconds. 5 seconds if less than 5 seconds. Only download once if it is blank or 0.	
	unit	type	"unit" type in dynamic area: "Picture/0": picture "Text/1": text "URLPicture/3": network picture "URLText/4": network text (txt file or json format data)
		command	Play orders, range 0~9 (maximum supports 10 units)
stuntType		Stunt type Stunt for "Picture" and "URLPicture" Stunt for "Text" and "URText"	
stuntSpeed		Stunt speed (1-16)	
stayTime		Stay time (seconds)	

	content	<p>If file content uploaded by command, this field is played file content:</p> <ol style="list-style-type: none"> 1. If type is URLPicture, URLText, this field appoints base64 code of standard URL format. 2. When type is URLText, URL can be downloading address of text file, also be network address of return json format data, when it's json format data, keyList must be non blank. <p>2. When type is "Picture/0" or "Text/1":</p> <ol style="list-style-type: none"> (1) Material content is data flow form, this field is picture flow or base64 code of text (2) When file is uploaded with form, this field is FileSaveAs name of uploaded file (3) When file type is "Picture/0", it supports update local materials, this field is local material route, and need to transmit "flexible" parameter (4) When type is "Text/1", it supports count down
	keyList	Element indexes of Base64 code format. Base64 Check Appendix 9 It's valid when type is "URLText", and network materials is json format
	flexible	<p>When dynamic area type is "Picture/0" or "Text/1", this parameter is used to mark material source. Ignore this parameter if it is not local material.</p> <p>"local": Local material "countdown": Countdown area (support only "Text/1" type).</p>
	gifFlag	<p>Flag of GIF picture</p> <p>"0": not GIF type "1": GIF type (do not support dynamically play at present, only as common picture)</p>
	bgColor	Background color (ARGB), it is valid when type is "Text" and "URLText" 0xFF000000 Example, black: 0xFF000000
	fontSize	Font size, valid when type is "Text" and "URLText"
	fontSizeType	<p>Unit of font size is pixel or point:</p> <p>"0": pixel "1": point</p>
	fontName	Font name, valid when type is "Text" or "URLText"
	fontColor	Font color (ARGB), valid when type is "Text" and "URLText" 0xFFFF0000 Example, red: 0xFFFF0000
	fontAttributes	Including "bold", "italic", "common". "bold" and "italic" can be combined by "&"
	alignment-H	<p>Horizontal alignment, valid when type is "Text" and "URLText":</p> <p>"left/0": left "right/1": right "center/2": center</p>
	alignment-V	<p>Vertical alignment, valid when type is "Text" and "URLText":</p> <p>"top/0": top "bottom/1": bottom "center/2": center</p>
	volume	volume for video (0-100)
	scaleMode	"Original" Scale mode, including "Window", "Original"
	rotationMode	Rotation mode, including 0 degree, 90 degree, 180 degree, 270 degree
	signature	BASE64 code of number signature for digest content
	digest	Digest arithmetic: "sha1", "md5", default is "sha1"
	offset	start/end offset of digest, default is "0"

		length	Length of digest content, default is the length after "offset". Length range $\geq 1\text{MB}$, $\leq 8\text{MB}$. When it's $\leq 1\text{MB}$, get full length.
		fingerprint	signature certificate fingerprint of SHA1 format

Additional:

When parameters "signature", "digest", "offset", "length", "fingerprint" use for file authentication ON/OFF, and start it,

4.10.2 - updateDynamicUnits

✓ *Command example*

```

{
  "protocol":{
    "name": "YQ-COM2","version": "1.0",
    "remotefunction":{
      "name": "UpdateDynamicUnits",
      "input": {
        "dynamics": [{
          "id": "0",
          "command":"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",
          "command":"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",
          "command":"0",
          "content":"c2hhcmUvN2VlZGY0OTA0ZGY3OGM2NjQzZWZMDA2ZTJmZTc1Y
mYuYm1w ",
          "flexible":"local"
        }
      ]
    }
  }
}

```

This command uses to update present dynamic unit, now, only support "Picture/0" and "Text/1" dynamic area. When you use this command, please ensure that there's only changes in materials, or there will be unknown error.

- ✓ "dynamics": Dynamic list which needs to be updated. Dynamic ID and unit command must be already existed, and is "Picture/0" or "Text/1".
 - ✓ "id": Dynamic area ID.
 - ✓ "command": Command unit, must be the same with command in "UpdateDynamic".
 - ✓ "content":
 - ✓ File flow: when file content is included in common POST request, base64 code for this file content.
 - ✓ Form file: When upload file by form file, this is FileSaveAs name of form file.
 - ✓ Local file: When updated materials are local file, this is local material route, and need to transmit "flexible" parameters.
 - ✓ "flexible":

When dynamic area is "Picture", this parameter uses to mark material source. You can ignore this parameters if it is not local materials.

- ✓ "local": Local materials.
- ✓ "countdown": Countdown area (only support "Text/1")

When open "FileAuthenticationON/OFF", command needs to include below parameters, used to the authentication of file or flow (excluding local materials):

- ✓ "signature": BASE64 code of number signature for digest
- ✓ "digest": "sha1" digest arithmetic: "sha1", "md5", default is "sha1"
- ✓ "offset": start/end offset for digest, default is "0"
- ✓ "length": Length of digest, default is length after "offset". Length range $\geq 1\text{MB}$ $\leq 8\text{MB}$.
Get whole file length if file $< 1\text{MB}$
- ✓ "fingerprint": signature certificate fingerprint of SHA1 format.

4.10.3 - clearDynamic

✓ *Command example*

```
{
  "protocol": {
    "name": "YQ-COM2", "version": "1.0",
    "remotefunction": {
      "name": "clearDynamic",
      "input": {
        "id": ["0", "1"]
      }
    }
  }
}
```

Delete playing dynamic area, means stop playing dynamic area and delete dynamic area (won't delete dynamic files which are saved already).

- ✓ "id": Dynamic area ID which needs to be deleted, delete all when it's ["*"].

4.10.4 - saveDynamicFile

✓ *Command example*

```
{
  "protocol": {
    "name": "YQ-COM2", "version": "1.0",
    "remotefunction": {
      "name": "SaveDynamicFile",
      "input": {
        "id": ["0", "1"]
      }
    }
  }
}
```

This command can save the dynamic file which is playing, it will play saved dynamic program after restart controller. Dynamic area won't save material for "URLPicture" and "URLText", only save URL of materials, users need to re download materials after restart controller.

- ✓ "id": Dynamic ID which needs to be saved, save all dynamic area which are playing when it is ["*"].

4.10.5 - deleteDynamicFile

✓ *Command example*

```
{
  "protocol": {
    "name": "YQ-COM2", "version": "1.0",
    "remotefunction": {
      "name": "DeleteDynamicFile",
      "input": {
        "id": ["0", "1"]
      }
    }
  }
}
```

Delete dynamic files which are already saved (saved by “SaveDynamicFile” command), this dynamic area will not be played again after restart controller. It won’t influence the dynamic programs which are playing.

- ✓ “id”: Delete dynamic ID which is saved, delete all dynamic areas which are saved when it [“*”].

4.10.6 - countDown

✓ *Command example*

```
{
  "protocol":{
    "name": "YQ-COM2","version": "1.0",
    "remotefunction":{
      "name": "countDown",
      "input": {
        "dynamics": [{
          "id": "0",
          "command": "0",
          "status":"on"
        },{"id": "1",
          "command": "0",
          "status":"off"
        }
      ]
    }
  }
}
```

Used to open or stop dynamic countdown function of “Text/1”.

- ✓ “dynamics”: Dynamic list. Dynamic id and unit command must be already existed, and type is “Text/1”.
 - ✓ “id”: Dynamic ID.
 - ✓ “command”: Unit command.
 - ✓ “status”: ON/OFF status of countdown. “on”: open countdown, “off”: stop countdown.

✓ *Reply example*

```
{
  "remotefunction": {
    "name": "countDown",
```

```
"output": {  
  "dynamics": [{  
    "id": "0",  
    "command": "0",  
    "clock": "56049",  
    "status": "on"  
  }, {"id": "1",  
    "command": "0",  
    "clock": "10031",  
    "status": "off"  
  }]  
}
```

- ✓ "dynamics": Dynamic list.
- ✓ "id": Dynamic ID.
- ✓ "command": Dynamic unit command.
- ✓ "clock": Countdown stop value, unit is ms.
- ✓ "status": Countdown ON/OFF status. "on": open countdown, "off": stop countdown.

4.11 Others

4.11.1 - setLedFlag

✓ Command example

```
{
  "protocol": {
    "name": "YQ-COM2", "version": "1.0",
    "remotefunction": {
      "name": "setLedFlag"
      "input": {
        "ledflag": "off"
      }
    }
  }
}
```

Mainly used to test screen, show “LED” in the center.

Parameters

- ✓ “ledflag”: “on” or 1- display, “off” or 0- do not display.

4.11.2 - setLogo

✓ Command example

```
{
  "protocol": {
    "name": "YQ-COM2", "version": "1.0",
    "remotefunction": {
      "name": "setLedFlag",
      "input": {
        "logoflag": "on",
        "filepath": "share/123.bon",
        "logopos": "center"
      }
    }
  }
}
```

Do not support now.

Parameters

- ✓ “logoflag”: “on” or 1 – Use customized startup picture, “off” or 0 – use factory startup picture; If you do not need startup picture, please send black picture “on” or 1
- ✓ “filepath”: picture path of startup logo
- ✓ “logopos”: “fullscreen”, full screen, zoom in/out according to screen size; “center”, center, keep picture scale; “topleft”, only zoom in, won’t keep picture scale.

4.11.3 - screenCapture

✓ Command example

```
{
  "protocol": {
```

```

    "name": "YQ-COM2", "version": "1.0",
    "remotefunction": {
      "name": "ScreenCapture",
      "input": {
        "suffix": "jpg",
        "framecount": "5",
        "picwidth": "800",
        "picheight": "600"
      }
    }
  }
}

```

Parameters

- ✓ "suffix": file type of screenshot which need to be saved, png - static picture or gif - animation (needs more time)
- ✓ "picwidth": picture width after screenshot
- ✓ "picheight": picture height after screenshot, if width is different with screen width, will adjust automatically.
- ✓ "framecount": frames of screenshot, maximum 15 frames, valid when "suffix" is gif.

✓ Reply example

```

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

```

"screenshot" is not real time command, need to inform upper computer how long should come to check (by "CheckFileInfo" command)

- ✓ "minwaittime": minimum waiting time for non-real time command, unit is seconds
- ✓ "maxwaittime": maximum waiting time for non-real time command, unit is seconds
- ✓ "filepath": After get screenshot, file path and file name should be used to following "CheckFileInfo"

When upper computer got reply, will send "CheckFileInfo" according to maximum/minimum waiting time, as to ensure finish screenshot or not; After confirm, obtain result by "DownloadFileFromController" command.

4.11.4 - lockScreen

✓ Command example

```

{
  "protocol": {

```



```

    "name": "YQ-COM2", "version": "1.0",
    "remotefunction": {
      "name": "lockScreen",
      "input": {
        "screenlockedstatus": "on"
      }
    }
  }
}

```

Parameters

- ✓ "screenlockedstatus": 'on' or 1 - lock, "off" or 0 - unlock "on".

4.11.5 - databaseQuery

✓ *Command example*

```

{
  "protocol": {
    "name": "YQ-COM2", "version": "1.0",
    "remotefunction": {
      "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"
      }
    }
  }
}

```

Parameters

- ✓ "host": IP Host domain name or IP of database server
- ✓ "port": Host port of database server
- ✓ "user": Visiting user name of database server
- ✓ "pass": base64code value of visiting passwords of database server
- ✓ "dbtype": database type "sqlserver" or "mysql"
- ✓ "dbname": When "dbtype" is "mysql", use to appoint database name
- ✓ "querycmd": Database checking command, be careful for command difference of different database type; Controller uses original parameters to check, won't do any modification

✓ *Reply example*

```

{
  "remotefunction": {
    "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"]
        ]
    }
}

```

Parameters

- ✓ "totalRows": Return to database to check result datas rows, if over 10 rows, will return only 10
- ✓ "totalColumns": Return to database to check result columns
- ✓ "field": Return one-dimensional array database to check result fields name (or named by command)
- ✓ "data": Return two-dimensional array database to check result

✓ *Error example*

```

{
  "remotefunction": {
    "name": "databaseQuery",
    "error": {
      "code": error code
      "mesg": description of error
    }
  }
}

```

Check Appendix 2

4.11.6 - updateGpioMode

✓ *Command example*

```

{
  "protocol": {
    "name": "YQ-COM2","version": "1.0",
    "remotefunction": {
      "name": "updateGpioMode",
      "input": {
        "mode": "0"
      }
    }
  }
}

```

Parameters

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

Note: Continuity time needs to keep 200ms, then can trigger program switch; after switch program, 3 seconds for save time, won't switch; this command has 5 seconds save time, cannot send again.

Singley control (- continuity, 0 cut-off, x ignore):

IN3	IN2	IN1	IN0	Program command
x	x	x	-	0

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

Natural group control (- continuity, 0 - cut-off)

IN3	IN2	IN1	IN0	Program command
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 (typical) group control

IN3	IN2	IN1	IN0	Program command
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

4.11.7 - switchServerMode

✓ *Command example*

```
{
  "protocol": {
    "name": "YQ-COM2", "version": "1.0",
    "remotefunction": {
      "name": "switchServerMode",
      "input": {
        "servermode": "off"
      }
    }
  }
}
```

```

    }
  }
}

```

This command is used when you use “SetControllerAttributes” and set relative parameters correctly. Common server mode or encryption server mode: “serverip” and “serverport”; Cloud server mode or encryption cloud server mode: “cloudip”, “cloudport” and “clouduserid”; JTC mode: “jtcproxyhost”, “jtcproxyport”, “jtcproxymode” and “jtcproxyprotocol”. What’s more, before use encryption mode, you need to send TLS certificate in advance.

Parameters

- ✓ "servermode": server mode which you need to switch
 - ✓ "off"-turn off all server modes
 - ✓ "server" - common server mode
 - ✓ "servertls" - TLS encryption server mode
 - ✓ "cloud" - Cloud server mode
 - ✓ "cloudtls" - TLS encryption cloud server mode
 - ✓ "jtcproxy" - JTC mode

4.11.8 - addCertificate

✓ Command example

```

{
  "protocol": {
    "name": "YQ-COM2", "version": "1.0",
    "remotefunction": {
      "name": "addCertificate",
      "input": {
        "content": "<PEM certificate content>",
        "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 for sending “servertls” mode which used for encryption certificate.

Parameters

- ✓ "content": Whole content of PEM format certificate
- ✓ "fingerprint": Certificate fingerprint of SHA1 format

4.11.9 - deleteCertificate

✓ Command example

```

{
  "protocol": {
    "name": "YQ-COM2", "version": "1.0",
    "remotefunction": {
      "name": "deleteCertificate",
      "input": {
        "items": [
          "31:F2:17:E5:25:4D:61:EF:AF:4F:29:CF:56:2B:F5:86:DC:DE:F2:65",
          "AB:34:BC:7C:1A:04:45:39:75:0C:5B:3D:54:BF:FF:C6:14:96:3E:A9"
        ]
      }
    }
  }
}

```

```

    }
  }
}

```

This command is used to delete “servertls” mode certificate.

Parameters

- ✓ "items": Certificate fingerprint(SHA1) list, delete all TLS certificates when it is “*”.

4.11.10 - fileVerifySwitch

✓ Command example

```

{
  "protocol": {
    "name": "YQ-COM2", "version": "1.0",
    "remotefunction": {
      "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:F
2:65"
      }
    }
  }
}

```

Parameters

- ✓ "authenticationswitch": Authentication for file "on": open “authenticationswitch” function "off":Close “authenticationswitch” function
- ✓ "signature": "FILEEVERIFYSWITCH" is digest, adopt “sha1” to do number signature , BASE64 code.
- ✓ "fingerprint": Signature fingerprint of SHA1 format

4.11.11 - playAudio

✓ Command example

```

{
  "protocol": {
    "name": "YQ-COM2", "version": "1.0",
    "remotefunction": {
      "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"
      }
    }
  }
}

```

```
}
}
}
```

Parameters

- ✓ "items": Audio file list which is waiting for playing. When "items" is ["*"], stop to display all audio file
- ✓ "filepath": Audio file path. Need to upload to controller first. Suggest the destination path is "share" catalog.
- ✓ "volume": Volume value. Default is 100.
- ✓ "silent": Keep silent after finish playing present audio, unit is seconds. Default is 0.
- ✓ "loop": Play times. According to audio list of "items". Loop playback if it's "0". When it >0, means playing times. Default is "1".

4.11.12 - setSerial

✓ Command example

```
{
  "protocol": {
    "name": "YQ-COM2", "version": "1.0",
    "remotefunction": {
      "name": "setserial",
      "input": {
        "serialattributes": "s2,4800,1000,"
      }
    }
  }
}
```

Used to set serial port parameters and open serial port communication service.

Parameters

Serial port mode parameters are separated by ",", input "serialattributes" orderly, attributes need to include all parameters, and need to leave a position for parameters which are not used.

1. Working mode of serial port
 - ✓ "off": Close serial port communication mode
 - ✓ "s1": Serial port protocol 1 mode, simple mode, follow "Asynchronous full color serial port communication protocol"
 - ✓ "s2": Serial port protocol 2 mode, BPCL customized
 - ✓ "s3": Modbus Serial port protocol 3 mode, Modbus
2. Baud rate, like 9600, 115200, unit bps
3. Overtime, unit is ms
4. equipment number, "s3" mode

4.11.13 - diagnosis

This command is for our engineers to diagnose controller error, name "diagnosis", for exact command, is by "command". Real time reply content is BASE-64 code format.

4.11.13.1 Check system time

✓ Command example

```
{
  "protocol": {
    "name": "YQ-COM2", "version": "1.0",
    "remotefunction": {
      "name": "diagnosis",
      "input": {
        "command": "date",
      }
    }
  }
}
```

Used to check present system time of controller, call system command “date”.

Parameters

- ✓ “command”: System command name which needs to call.

✓ Reply command

```
{
  "remotefunction": {
    "name": "diagnosis",
    "output": {
      "command": "date",
      "result": "VHV1IEp1bCAGMyAxMTToyMjoyOSBDU1QgMjAxOA=="
    }
  }
}
```

4.11.13.2 CheckHardwareTime

✓ Command example

```
{
  "protocol": {
    "name": "YQ-COM2", "version": "1.0",
    "remotefunction": {
      "name": "diagnosis",
      "input": {
        "command": "hwclock"
      }
    }
  }
}
```

Check controller hardware time, “hwclock”.

Parameters

- ✓ “command”: System command name which need to call.

✓ Reply command

```
{
  "remotefunction": {
    "name": "diagnosis",
    "output": {
```

```

        "command": "hwclock",
        "result": "VHV1IEp1bCAGMyAxMzowMDozMiAyMDE4ICAwLjAwMDAwMgBzZWVbmRz"
    }
}

```

4.11.13.3 Check file catalog list

✓ Command example

```

{
  "protocol": {
    "name": "YQ-COM2", "version": "1.0",
    "remotefunction": {
      "name": "diagnosis",
      "input": {
        "command": "ls",
        "arguments": {
          "path": "/log"
        }
      }
    }
  }
}

```

Check file catalog list, call system command “ls -l <path>”.

Parameters

- ✓ “command”: System command name which needs to call.
- ✓ “arguments”: Parameters for system command name.
 - ✓ “path”: Catalog path which needs to check.

✓ Reply example

```

{
  "remotefunction": {
    "name": "diagnosis",
    "output": {
      "command": "ls",
      "result": "LXJ3LXJ3LXJ3LSAgICAxIHJvb3QgICAgIHJvb3QgICAgICAgICAgI..."
    }
  }
}

```

4.11.13.4 Check file content

✓ Command example

```

{
  "protocol": {
    "name": "YQ-COM2", "version": "1.0",
    "remotefunction": {
      "name": "diagnosis",
      "input": {
        "command": "cat",
        "arguments": {
          "file": "/log/playerLog"
        }
      }
    }
  }
}

```



```

    }
  }
}

```

Check file content, call system command “cat <file>”.

Parameters

- ✓ “command”: System command name which needs to call.
- ✓ “arguments”: Parameters for system command name
 - ✓ “file”: File path which needs to check

✓ *Reply command*

```

{
  "remotefunction": {
    "name": "diagnosis",
    "output": {
      "command": "cat",
      "result": "WzIwMTgtMDYtMDggMTc6MTY6MTFdwzIxMF1bTVBdw0lORk9dOiB...",
    }
  }
}

```

Return file content should < 4K. It will ignore the front part. You can check whole content by downloading.

4.11.13.5 CheckFileHeadContent

✓ *Command example*

```

{
  "protocol": {
    "name": "YQ-COM2", "version": "1.0",
    "remotefunction": {
      "name": "diagnosis",
      "input": {
        "command": "head",
        "arguments": {
          "file": "/log/playerLog",
          "lines": "10"
        }
      }
    }
  }
}

```

Check file head line content, call system command “head -n <lines> <file>”.

Parameters

- ✓ “command”: System command name which needs to call.
- ✓ “arguments”: Parameters for system command name
 - ✓ “file”: File path which needs to check
 - ✓ “lines”: Check lines.

✓ *Reply example*

```

{

```

```

    "remotefunction": {
      "name": "diagnosis",
      "output": {
        "command": "head",
        "result": "WzIwMTgtMDYtMDggMTC6MTY6MTFdwzMXMF1bTVBdw0lORk9d0iB..."
      }
    }
  }
}

```

Return file content should < 4K. It will ignore the front part. You can check whole content by downloading.

4.11.13.6 CheckFileEndContent

✓ Command example

```

{
  "protocol": {
    "name": "YQ-COM2", "version": "1.0",
    "remotefunction": {
      "name": "diagnosis",
      "input": {
        "command": "tail",
        "arguments": {
          "file": "/log/playerLog",
          "lines": "10"
        }
      }
    }
  }
}

```

Check file file end line content, call system command “tail -n <lines> <file>”.

Parameters

- ✓ “command”: System command name which needs to call.
- ✓ “arguments”: Parameters for system command name
 - ✓ “file”: File path which needs to check
 - ✓ “lines”: Lines which need to check.

✓ Reply command

```

{
  "remotefunction": {
    "name": "diagnosis",
    "output": {
      "command": "tail",
      "result": "WzIwMTgtMDctMDQgMTA6MzY6MzRdwzMTY1bTVBdw0lORk9d0iBb..."
    }
  }
}

```

Return file content should < 4K. It will ignore the front part. You can check whole content by downloading.

4.11.13.7 MatchTextContent

✓ Command example:

```
{
  "protocol": {
    "name": "YQ-COM2", "version": "1.0",
    "remotefunction": {
      "name": "diagnosis",
      "input": {
        "command": "grep",
        "arguments": {
          "file": "/log/playerLog",
          "patterns": ["P1", "P2"]
        }
      }
    }
  }
}
```

Check text content which match with regular expression, call system command "grep -e <patterns[0]> -e <patterns[1]> ... <file>".

Parameters

- ✓ "command": System command name which needs to call.
- ✓ "arguments": Parameters for system command name.
 - ✓ "file": File path which needs to check.
 - ✓ "patterns": Basic regular expression list, cannot over 8 pcs.

✓ Reply command

```
{
  "remotefunction": {
    "name": "diagnosis",
    "output": {
      "command": "grep",
      "result": "WzIwMTgtMDctMDMgMTg6MTU6MzFdIFtVRFBdIFtFUlJPUiAgIF0..."
    }
  }
}
```

4.11.13.8 CheckSystemProcess

✓ Command example

```
{
  "protocol": {
    "name": "YQ-COM2", "version": "1.0",
    "remotefunction": {
      "name": "diagnosis",
      "input": {
        "command": "ps"
      }
    }
  }
}
```

Check process which is running in system, call system command “ps ax”.

Parameters

✓ “command”: System command name which needs to call.

✓ *Reply command*

```
{
  "remotefunction": {
    "name": "diagnosis",
    "output": {
      "command": "ps",
      "result": "ICBQSUQgVFRZICAgICAgU1RBVCAGIFRJTUUgQ09NTUFORAogICA..."
    }
  }
}
```

4.11.13.9 CheckSystemStorage

✓ *Command example*

```
{
  "protocol": {
    "name": "YQ-COM2", "version": "1.0",
    "remotefunction": {
      "name": "diagnosis",
      "input": {
        "command": "free"
      }
    }
  }
}
```

Check system storage, call system command “free”.

Parameters:

✓ “command”: System command name which needs to call.

✓ *Reply example:*

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

4.11.13.10 TerminateProcess

✓ *Command example*

```
{
  "protocol": {
    "name": "YQ-COM2", "version": "1.0",
    "remotefunction": {
      "name": "diagnosis",

```



```
{
  "protocol": {
    "name": "YQ-COM2", "version": "1.0",
    "remotefunction": {
      "name": "diagnosis",
      "input": {
        "command": "resolveip",
        "arguments": {
          "host": "g.cn",
        }
      }
    }
  }
}
```

Analysis hostname to IP address, call system command “resolveip <host>”.

Parameters

- ✓ “command”: System command name which needs to call.
- ✓ “arguments”: Parameters for system command name.
 - ✓ “host”: Hostname which needs to analysis.

✓ *Reply example*

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

Maybe error reply:

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

When command transfer is timeout, usually, domain name you set is error.

4.11.13.13 CheckRouterList

✓ *Command example:*

```
{
  "protocol": {
    "name": "YQ-COM2", "version": "1.0",
    "remotefunction": {
      "name": "diagnosis",
      "input": {
        "command": "route"
      }
    }
  }
}
```

```

    }
  }
}

```

Check router list, call system command “route -n”.

Parameters:

✓ “command”: System command name which needs to call.

✓ *Reply example:*

```

{
  "remotefunction": {
    "name": "diagnosis",
    "output": {
      "command": "route",
      "result": "S2VybmVsIElQIHJvdXRpbmcgdGFibGUKRGVzdGluYXRpb24gICAg..."
    }
  }
}

```

4.11.13.14 CheckNetworkStatus

✓ *Command example:*

```

{
  "protocol": {
    "name": "YQ-COM2", "version": "1.0",
    "remotefunction": {
      "name": "diagnosis",
      "input": {
        "command": "netstat"
      }
    }
  }
}

```

Check network connection status and relevant information, call system command “netstat -anp”.

Parameters

✓ “command”: System command name which needs to call.

✓ *Reply example:*

```

{
  "remotefunction": {
    "name": "diagnosis",
    "output": {
      "command": "netstat",
      "result": "QWN0aXZlIEludGVybmV0IGNvbm51Y3Rpb25zIClzZXJ2ZXJzIGFu..."
    }
  }
}

```

4.11.13.15 CheckNetworkConnection

✓ Command example:

```
{
  "protocol": {
    "name": "YQ-COM2", "version": "1.0",
    "remotefunction": {
      "name": "diagnosis",
      "input": {
        "command": "ping",
        "arguments": {
          "host": "g.cn",
        }
      }
    }
  }
}
```

Check that the host is connecting with network or not. Call system command "ping -w4 <host>".

Parameters

- ✓ "command": System command name which needs to call.
- ✓ "arguments": Parameters for system command name.
 - ✓ "host": Hostname which needs to analysis.

✓ Reply example:

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

This command is asynchronous command, try to used "findFile" to check "resultFile" is existed or not in minimum waiting time "minwaitTime", if you do not get "resultFile" file in maximum waiting time "maxWaitTime", it is failed.

Parameters:

- ✓ "resultFile": File path you saved for the result which is executed by command. "<time stamp>" is for establishing file.
- ✓ "minWaitTime": Minimum waiting time for checking asynchronous command result.
- ✓ "maxWaitTime": Maximum waiting time for checking asynchronous command result.

4.11.13.16 TrackRouter

✓ Command example

```
{
  "protocol": {
    "name": "YQ-COM2", "version": "1.0",
```



```

    "remotefunction": {
      "name": "diagnosis",
      "input": {
        "command": "tracert",
        "arguments": {
          "host": "g.cn"
        }
      }
    }
  }
}

```

"tracert -n1 -m10 -q1 -w2 <host>". Track all paths (router or gateway) transferred in network of data package, call system command "tracert -n1 -m10 -q1 -w2 <host>".

Parameters

- ✓ "command": System command name which needs to call.
- ✓ "arguments": Parameters for system command name.
 - ✓ "host": Hostname which needs to analysis.

✓ Reply example

```

{
  "remotefunction": {
    "name": "diagnosis",
    "output": {
      "command": "ping",
      "resultFile": "/share/tracert_<time stamp>.rst",
      "minWaitTime": "20",
      "maxWaitTime": "25"
    }
  }
}

```

This command is asynchronous reply command, try to used "findFile" to check "resultFile" is existed or not in minimum waiting time "minWaitTime", if you do not get "resultFile" file in maximum waiting time "maxWaitTime", it is failed.

Parameters

- ✓ "resultFile": File path you saved for the result which is executed by command. "<time stamp>" is for establishing file.
- ✓ "minWaitTime": Minimum waiting time for checking asynchronous command result.
- ✓ "maxWaitTime": Maximum waiting time for checking asynchronous command result.

4.11.13.17 OpenRemoteControl

✓ Command example

```

{
  "protocol": {
    "name": "YQ-COM2", "version": "1.0",
    "remotefunction": {
      "name": "diagnosis",
      "input": {
        "command": "htran",

```

```
        "arguments": {
            "host": "222.66.141.10",
            "port": "16080"
        }
    }
}
```

Open “remotely log in controller” command.

Parameters

- ✓ “command”: System command name which needs to call.
- ✓ “arguments”: Parameters for system command name.
 - ✓ “host”: Hostname which needs to analysis.
 - ✓ “port”: Port for remotely control host.

✓ *Reply example*

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

Parameters

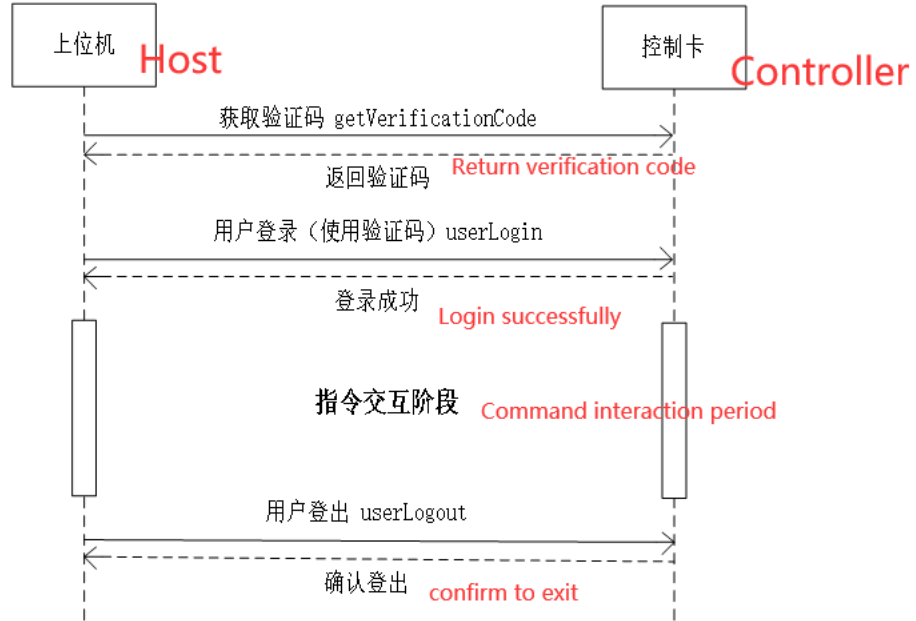
- ✓ “pid”: Process number of htran, can be used as branch command of “kill”.

This branch command is not opened.

5. Common Process

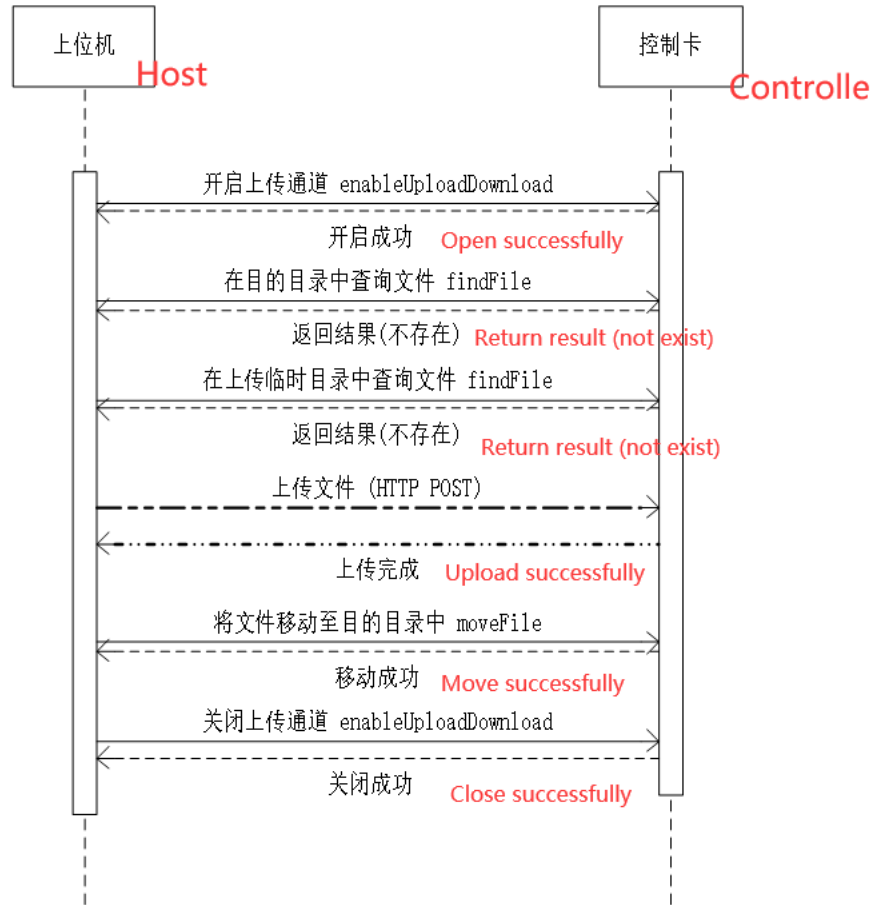
5.1 LoginProcess

You need to login first before send real HTTP command from Host to controller:



5.2 FileUploadProcess

Reference process for file uploading. By POST. When upload to controller, will upload to temporary catalog first, and host will move it into appointed catalog.



Specification:

1. HTTP URI path of common file uploading is "/upload".
2. HTTP URI path of dynamic file uploading is "/dynamic/;stok=[32 bytes valid sessionID]"

5.3 ProgramPlayProcess

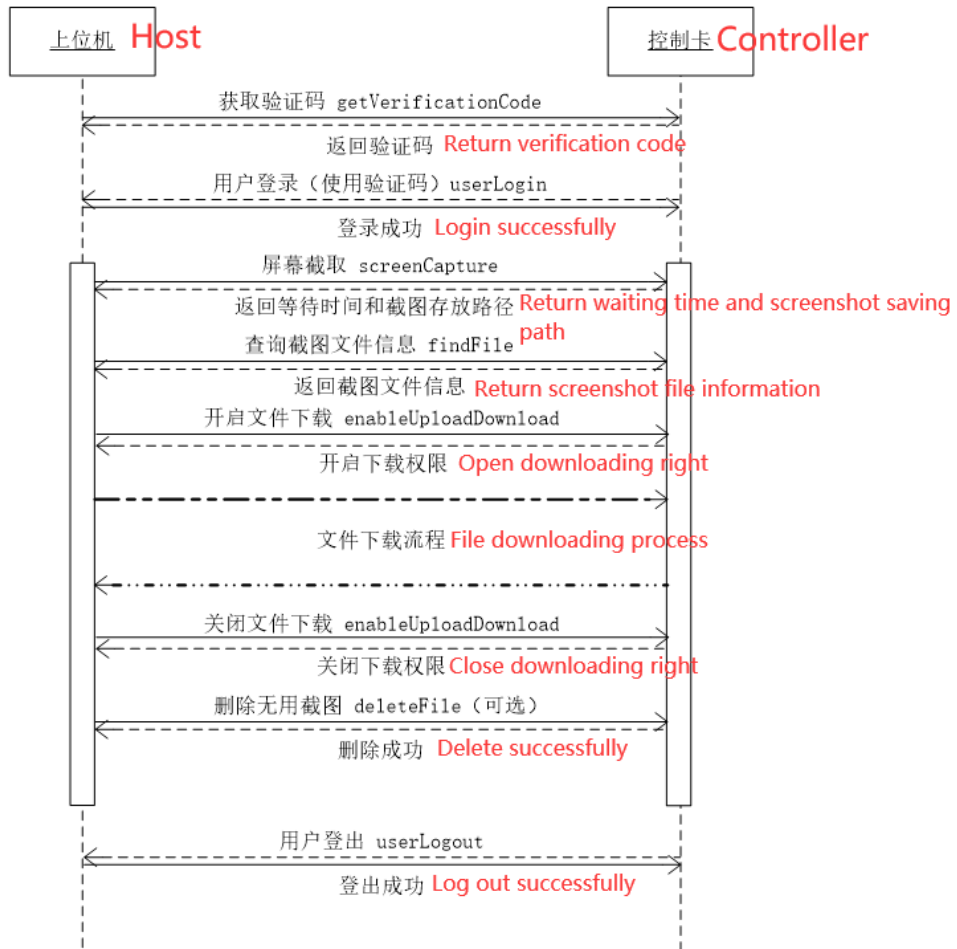
Upload/Play reference process for controller program. In this process, check, upload, move of program file, each file needs to be executed once, until all program files are uploaded.



Before upload program, suggest you obtain the rest space by “CheckAppointMediumInfo”; If storage is not enough, delete useless materials first, then check storage; If still not enough, stop playing programs first and then delete useless materials, and check the rest storage again; If not enough, means your program is too big.

You can get total storage and the rest storage by “CheckAppointMediumInfo” to decide stop playing programs and delete useless materials or not.

5.4 ScreenshotProcess



APPENDIX 1 Attributes List

Type	Attribute Name	Description	Default valueApp	Application command
System	controllertype	Controller type, check appendix 3	Little-endian Decimalism type, like 8536,8792,9048, etc.	-
	pid	Controller ID number	<character string start with "50", 32 bytes	-
	barcode	Controller barcode	<real barcode>	-
	controllername	Controller name	Blank	setAttributes
	width	Screen width	<default width>	setSize
	height	Screen height	<default height>	setSize
	Screendata	Screen data	1	-
	foldtype	fold type	0	SetFoldScreen
	foldcount	fold lines	Blank	SetFoldScreen
	foldwidth	Horizontal fold width	Blank	SetFoldScreen
	foldheight	Vertical fold width	Blank	SetFoldScreen
	Logicwidth	Logic width	Blank	-
	Logicheight	Logic height	Blank	-
	screenrotation	Screen rotation: 0,90,180,270	0	setSize
	gpiomode	IO program modes off/0、discrete/1、 combined/2、gray/3	off	updateGpioMode
	serialattributes	Serial port parameters	Blank	setSerial
prompt	switch of prompt information	on	setAttributes	
Firmware	firmwareversion	Firmware version	<yymmddxx>	updateFirmware
	Playerversion	Player version	<yymmddxx>	updateFirmware
	Reliedversion	Replied version of present firmware version	<yymmddxx>	updateFirmware
	fpgaversion	FPGA version	<yymmddxx>	updateFirmware
Network	dnserver	DNS server address	Blank	setNetworkOption
	mac	MAC address of Internet card	<real MAC>	setNetworkOption
	ipmode	Assigning modes of internet IP address dhcp/static	static	setNetworkOption
	ip	Internet IP address	192.168.0.199	setNetworkOption
	subnetmask	Internet subnet mask	255.255.255.0	setNetworkOption
	gateway	Internet gateway	192.168.0.1	setNetworkOption
	wificonnectmode	Assigning modes of WiFi address 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	setApAttributes	

	apssid	AP mode hotspot name (secret key of hotspot is not in attributes list, you can set, but cannot check.	<real barcode>	setApAttributes
	restartnetwork	Restarted network or not after setNetworkOption: wait/completed	completed	-
	serverip	Common server proxy IP address	Blank	setAttributes
	serverport	Common server proxy ports	Blank	setAttributes
	cloudip	Cloud server proxy IP address	139.196.231.196	setAttributes
	cloudport	Cloud server proxy port	3802	setAttributes
	clouduserid	Cloud server user ID	Blank	setAttributes
	jtcattributes	1. JTC proxy address 2. JTC proxy port 3. Network mode: server/client 4. Protocol type: 5. Mode equipment address: 6. Baud rate: 7. Data width Use for JTC proxy attributes setup, separated by “,”, send in fixed position	Blank	setAttributes
	servermode	Server mode: off、server、servertls、cloud、cloudtls、jtcproxy	cloud	switchServerMode
	ppp_apn ①	4G module calling APN (access name)	Blank	setAttributes
	ppp_number ①	4G module calling number	Blank	setAttributes
	ppp_username ①	4G module calling username	Blank	setAttributes
	ppp_password ①	4G module calling passwords	Blank	setAttributes
Time zone	timezoneflag	Auto time on/off	off	setTimezoneServer
	timezone	Time zone: main time zone/subordinate time zone	Asia/Shanghai	setTimezoneServer
	timezoneserver	Auto time network address	120.24.166.46	setTimezoneServer
Program	playlist	Present program playing list	Blank	play
	programlockstatus	Program lock status, 0/1	0	lockProgram
	programlockname	Locked program name	Blank	lockProgram
	playermode	Player mode	0	switchplayermode
FTP	ftpserveraddr	ftp server address; abandoned, can be used to save common info	Blank	setAttributes
	ftpserverport	ftp server port; abandoned, can be used to save common info	Blank	setAttributes

	ftploginname	ftp server user name; abandoned, can be used to save common info	Blank	setAttributes
	ftploginpassword	ftp server passwords; abandoned, can be used to save common info	Blank	setAttributes
Others	ipflag	IP flag on/off	off	setAttributes
	outputtype	Output type: LCD/DVI	LCD	setOutputType
	loglevel	Log level: DEBUG/INFO/WARNING/ERROR	INFO	-
	storagemedia	Storage media emmc,sd,usb1	emmc	setStorageMedia
	screenlockedstatus	Screen lock status: on/off	off	lockScreen
	screenonoffsatus	Screen switch status: on/off	on	screenOnOff
	customscreenstatus	Timing ON/OFF screen	Blank	customScreenOnOff
	volume	Volume: 0-100	100	setVolume
	brightness	Brightness 1-255	255	systemBrightness
	brightnessmode	Brightness mode: system custom auto	system	systemBrightness customBrightness autoBrightness
	httpserverport	httpserver monitor port	80	-
	schedulerequestflag	Schedule task flag: true/false	false	-
	i2cnum	I2C main equipment numbers	2	-
	i2caddress	I2C subordinate equipment address	0x23	-
	optimizedspeed	Optimized speed on/off (not started)	on	setAttributes
	language	Prompt info language	zh_CN	setLanguage
bxparam	For ONBON only	Blank	setAttributes	
customize	Customized parameters	Blank	setAttributes	

Note: No need to set for common network; For special network, need specific parameters.

Appendix 2 Error list

Error	Definition	Error description
1	ERR_HTTP_REQUEST_EMPTY	HTTP request parameter is empty
2	ERR_HTTP_REQUEST_METHOD	HTTP request type is method
3	ERR_PROTOCOL_PARSE	Protocol parse error
4	ERR_PROTOCOL_NAME	Protocol name is error
5	ERR_PROTOCOL_VERSION	Protocol version is error
6	ERR_PID	PID error
7	ERR_BARCODE	Controller barcode error
8	ERR_HTTP_REQUEST_PARAMETER_KEY	Protocol request key error
9	ERR_CONFIG_PARSE	Configuration file parse error
10	ERR_PERMISSION	Permission is not enough
11	ERR_INVALID_AUTHENTICATION	Invalid authentication
12	ERR_ACCESS_VIOLATION	Violate access
13	ERR_IO_READ_WRITE	Input/Output error
14	ERR_COMMAND_PARAMETER_KEY	Request command parameter error
15	ERR_COMMAND_CALL	Request command calling 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	Execute system command error
20	ERR_COMMAND_PARAMETER_VALUE	Request command parameter value error
21	ERR_USER_NOT_EXISTS	User doesn't exist
22	ERR_USER_PASSWORD	Passwords error
23	ERR_STORAGE_MEDIA_NOT_EXISTS	Media storage doesn't exist
24	ERR_FILE_PATH	File path error
25	ERR_MAC_FORMAT	MAC address format error
26	ERR_UDP_TRANSMIT	UDP transmitting error
27	ERR_VERIFICATION_CODE	Verification code error
28	ERR_NO_FIRMWARE	Firmware doesn't exist
29	ERR_USER_WORK_PATH	Establish user catalog failed
30	ERR_PLAYER_CMD	Player command error
31	ERR_GET_WIFI_LIST	Get WiFi list failed
32	ERR_WIFI_CONNECT_TIMEOUT	WiFi connects overtime
33	ERR_HOTSPOT_NOT_FOUND	Do not find hotspot
34	ERR_WIFI_PASSWORD	WiFi passwords is incorrect
35	ERR_NETWORK_RESTART	Network is restarting
36	ERR_XSER_COMMAND_FAILED	XSER command failed
37	ERR_SEARCH_SENSOR_BUSY	Searching sensors
38	ERR_LANGUAGE_NOT_SUPPORTED	Not supported language
39	ERR_DATABASE_CONNECT_FAILED	Connect database server failed
40	ERR_DATABASE_UNKNOW_TYPE	Database type error
255	ERR_OTHER	Other errors

Appendix 3 BX-Y series types

Model	Type code		Maximum pixels	Maximum width/height	Minimum width/height
	Pre-stage	Post-stage			
BX-Y04	Little-endian 0x2058/8280 Big-endian 0x5820/22560	0x0A86/2694	65,536 (256x256)	1024/256	64/32
BX-Y08	Little-endian 0x2158/8536 Big-endian 0x5821/22561	0x0A87/2695	131,072 (512x256)	1024/512	64/32
BX-Y2	Little-endian 0x2258/8792 Big-endian 0x5822/22562	0x0A9B/2715	614,400 (1024x600)	2048/2048	64/32
BX-Y3	Little-endian 0x2358/9048 Big-endian 0x5823/22563	0x0A9C/2716	1,310,720 (1280x1024)	2048/2048	64/32
BX-Y2L	Little-endian 0x2458/9304 Big-endian 0x5824/22564	0x0A9D/2717	262,144 (1024x256)	2048/2048	64/32
BX-Y5E	Little-endian 0x2958/10584 Big-endian 0x5829/22569	0xB10/2832	2,560,000 (2560x1000)	3840/3840	64/64
BX-Y1L	Little-endian 0x2758/10072 Big-endian 0x5827/22567	0xA89	262,144 (1024x256)	2048/2048	64/32
BX-Y1	Little-endian 0x2558/9560 Big-endian 0x5825/22565	0xA88	614,400 (1024x600)	2048/2048	64/32
BX-Y1A	Little-endian 0x2d58/11608 Big-endian 0x582d/22573	0xA8C	614,400 (1024x600)	2048/2048	64/32
BY-YL	Little-endian 0x2a58/10840 Big-endian 0x582a/22570	-	2,073,600 (1920x1080)	1920/1080	720/480
BX-Y3E	Little-endian 0x2858/10328 Big-endian 0x5828/22568	待定	1,310,720 (1280x1024)	1920/1920	64/32

Note: Maximum width/height is the width/height before fold.

Appendix 4 Standard timezone

Africa timezone		
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 timezone		
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 timezone		
Antarctica/Casey	Antarctica/Davis	Antarctica/DumontDUrville
Antarctica/Macquarie	Antarctica/Mawson	Antarctica/McMurdo
Antarctica/Palmer	Antarctica/Rothera	Antarctica/Syowa
Antarctica/Troll	Antarctica/Vostok	
Asia timezone		
Asia/Aden	Asia/Almaty	Asia/Amman
Asia/Anadyr	Asia/Aqtou	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/Pyzylorda
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 timezone		
Atlantic/Azores	Atlantic/Bermuda	Atlantic/Canary
Atlantic/Cape_Verde	Atlantic/Faroe	Atlantic/Madeira
Atlantic/Reykjavik	Atlantic/South_Georgia	Atlantic/St_Helena
Atlantic/Stanley		
Australia timezone		
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
Europe timezone		
Europe/Amsterdam	Europe/Andorra	Europe/Astrakhan
Europe/Athens	Europe/Belgrade	Europe/Berlin
Europe/Bratislava	Europe/Brussels	Europe/Bucharest
Europe/Budapest	Europe/Busingen	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	
Indian timezone		
Indian/Antananarivo	Indian/Chagos	Indian/Christmas
Indian/Cocos	Indian/Comoro	Indian/Kerguelen
Indian/Mahe	Indian/Maldives	Indian/Mauritius
Indian/Mayotte	Indian/Reunion	
Pacific area timezone		
Pacific/Apia	Pacific/Auckland	Pacific/Bougainville
Pacific/Chatham	Pacific/Chuuk	Pacific/Easter
Pacific/Efate	Pacific/Enderbury	Pacific/Fakaofu
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 timezone		
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

Appendix 5 Sensor address list

Sensor address uses short integer without symbol: 0x0000~0xFFFF, high 8 digits used to mark sensor bus port; low 8 digits uses to mark equipment address in different bus.

Address	Description	Note.
0x0000~0x00FF	keep it	
0x0100~0x07FF	On-board bus port	Maximum support 7 on-board bus port; BX-Y series have only number 1, cannot be used.
0x0800~0x0FFF	On-board I ² C bus port	Maximum support 8 on-board I ² C bus port; BX-Y series have only number 1.
0x1000~0x17FF	On-board RS232 serial bus port	Maximum support 8 on-board RS232 bus port; BX-Y series have only number 1.
0x1800~0x1FFF	On-board RS485 serial bus port	Maximum support 8 on-board RS485 bus port; BX-Y series have only number 1, and same with RS232.
0x2000~0x27FF	USB-RS232 serial bus port	Maximum support 8 USB-RS232 bus port; BX-Y series support number 1 and number 2: single USB port supports number 1, number 1 is under double USB port.
0x2800~0x2FFF	USB-RS485 serial bus port	Maximum support 8 USB-RS232 bus port; BX-Y series support number 1 and number 2: single USB port support number 1, number 1 is under double USB port.
0x3000~0x30FF	Bus port for environmental sensor	Only BX-Y08A and BX-Y1A support this port
0x3100~0x7FFF	keep it	
0x8000~0x80FF	Network 1, VMF functional card address range	address for network one is 0x8000, second is 0x8001...
0x8100~0x81FF	Network 2, VMF functional card address range	
...	...	
0x8F00~0x8FFF	Network 16, VMF functional card address range	
0x9000~0xFFFF	keep it	

Sensor equipment address list

Equipment address	Functions
0	SEnsor
1	Air quality sensor PM2.5 (unitType=0) or PM10 (unitType=1)
2	Wind spend sensor
3	Wind direction sensor
4	Noise sensor
5	Temperature (sequence=261)/Humidity (sequence=262) sensor of compound sensor
6	Noise sensor of compound sensor
7	Air quality sensor PM2.5 (unitType=0) or PM10 (unitType=1) of compound sensor
8	Barometric pressure sensor of compound sensor

9	Illumination intensity sensor of compound sensor
10	Atmospheric anion detection

Appendix 6 Sensor function number list

Sensor function number used to distinguish sensor type of functional card, other sensor type use sensor address (8 bus address+8 equipment address)

Number	Functions
0	Without sensor or unknown sensor
1~127: For sensors in VMF functional card (can be used on on-board sensor too, only #1 bus)	
1	Brightness sensor of I ² C bus
2	Temperature sensor, when sensor address is in the range of functional card, connect #1 in functional card with temperature sensor; If there is humidity sensor in bus, then it's for temperature sensor in temp&humid sensor.
3	Humidity sensor, when sensor address is in the range of functional card, connect #2 in functional card with temperature sensor; If there is humidity sensor in bus, then it's for temperature sensor in temp&humid sensor.
4	Humidity sensor in temp&humid sensor, when sensor address is in the range of functional card, connect #1 in functional card with humidity sensor
5	Humidity sensor in temp&humid sensor, only when sensor address is in the range of functional card, connect #2 in humidity sensor of temp&humid sensor (do not have single humidity sensor)
6	Smoke sensor (alertor)
7~255	Keep it, as 0
256~512: Support sensor in modbus protocol (Now is meteorological sensor)	
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 compound sensor
262	Humidity sensor in compound sensor
263	Noise sensor in compound sensor
264	PM2.5 air quality sensor in compound sensor
265	PM10 air quality sensor in compound sensor
266	Barometric pressure sensor of compound sensor
267	Illumination sensor in compound sensor
268~282 : only for environmental sensor bus port (0x3000~0x30FF)	
268	Temperatur sensor, 485 bus port, temperature sensof of temp&humid sensor
269	Humidity sensor, 485 bus port, humidity sensor of temp&humid sensor
270	Brightness sensor, 485 bus port
271	Atmosphere anion detection
272	PM100 air quality sensor in compound sensor
273	Air quality sensor (PM100)
274	Liquid level apparatus
275	Common sensor 0 (not used)
276~282	Common sensor 1~7 (not used)
283~512	Keep it, as 0
512~: Customized sensor	
512~	Keep it, as 0

Appendix 7 Uploading file name in form

```

POST /upload HTTP/1.1
Content-Type: multipart/form-data; boundary=-----86600935
9719137606378166
Accept: text/json
accept-encoding: gzip, deflate
content-length: 223019

-----866009359719137606378166
Content-Disposition: form-data; name="409b24bb8fb7f03d76908852c9f105d0.bmp"; f
ilename="testPic1.bmp"
Content-Type: image/bmp

BM6.....6...(.....`..... .... (completed file content)
-----866009359719137606378166--

```

- ✓ "filename": File name before uploading (not important)
- ✓ "name": Temporary file name saved in controller after uploading (will move later), as below:
 - ✓ Two named methods:
 - Start with MD5 value, format: {MD5 value}].[file name suffix], controller needs to do MD5 verification, if get error, controller will reply with error and give up this file; File name starts with "_", format: _{a~z}[A~Z][0-9]}.{file name suffix}, controller card will not do verification, and won't reply with error
 - ✓ File name can use character including: numbers (0-9), capital/small letter (a~z,A~Z), "_", ".", "-"; Do not support Chinese or other special words.

Language list of prompt information of controller

Mark	Specification	Mark	Specification
zh_CN	Simplified Chinese	zh_TW	Traditional Chinese
en_US	English	ru_RU	Russian
vi_VN	Vietnamese		

Appendix 9 ESC

keyList: Dynamic area keyList:

- ✓ Dynamic keyList support only json format single element index ESC, hierarchy increase
- ✓ Separate symbol of key value ESC is ""
- ✓ If it is array, use square brackets plus index value [n]
- ✓ Send characters by base64 code after ESC

Example:

URL: Request URL:

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

Receiving data:

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

If index element should be "stampUTC", then index ESC as below:

ESC character:

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

base64 code:

cmVzdWx0IlsxXSJtZXNzYWdlIlsxXSJbMF0ic3RhbXBVVEM=

The last attributes transferring mode:

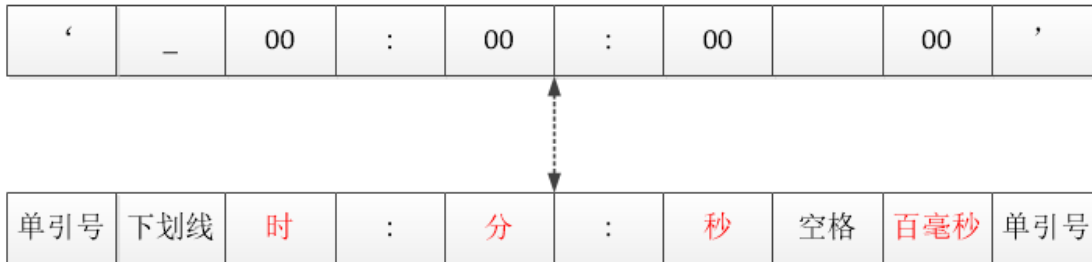
"keyList": "cmVzdWx0IlsxXSJtZXNzYWdlIlsxXSJbMF0ic3RhbXBVVEM="

Appendix 10 Countdown format

“Text/1” dynamic area supports countdown function. Send by “content”. There are two formats. All are sent by base64 code.

Format one: When total time for countdown more than 59 seconds, display minutes and seconds, accuracy is 1 seconds, when countdown time is 59 seconds, display only seconds, accuracy is 0.1 seconds.

Format as below:



Format:

Hour: Hours, will convert to minutes.

Minute: Minutes.

Seconds: Seconds.

millisecond: unit is 100 millisecond, as below, maximum supports 09.

00: 0 millisecond

01: 100 millisecond

02: 200 millisecond

09: 900 millisecond

Others are fixed format.

Example one:

Countdown cardinal number is 85510200 millisecond, “content” is base64 code of

```
"_23:45:10 02"
```

```
{
  ...
  "content": "4oCZXzIz0jQ10jEwIDAy4oCZ",
  ...
}
```

Display as below: start from 1425 minutes and 10 seconds. When countdown time starts 1 minute, next second start show 0.1 seconds accuracy. Countdown finish, will show 00.0

1425:10

01:00

59.9

00.0