# QCoo Protocol

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|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Project Name** | **Version** | **Comment** | **Date** | **perator** |
| **QCoo** | **2.0.2** | **Finish Protocol** | **2016.09.01** | **Yu Liang** |
| **QCoo** | **2.0.3** | **Fix LED0 Bugs** | **2016.09.21** | **Yu Liang** |
| **QCoo** | **2.0.4** | **Change Baud rate** | **2017.01.03** | **Yu Liang** |
| **QCoo** | **2.0.5** | **Add English** | **2017.05.09** | **Yu Liang** |

## Comment

QCoo is compatable for Arduino, and it has the same bootloader with Arduino UNO;you can use Arduino IDE update your firmware.

What’s QCoo :

Maybe you can regard QCoo as a display device which can community via bluetooth with smart phone .and the smart phone can send command to QCoo to control leds containing brightness color position etc.

QCoo is not completely a executor ,QCoo will update the gyro date to smart phone via BLE .And every time Smart Phone send a command to QCoo ,QCoo will send back a request OK message to Smart Phone if QCoo has executed the command successfully .So the communication is stable By this way .

## ****There are Two Ways For Communication :****

### ****One 、Execute ：****

1. Control LED method One
2. Control LED method two
3. Control LED method three
4. Fresh display
5. Brightness setting
6. Change effect
7. Power OFF
8. Motor shake setting
9. Set Connection
10. Save Brightness
11. Dice Mode
12. Initialization Gyro

### ****Two、Query ：****

1. Query Color
2. Query Voltage
3. Query Change State

Protocol Date Format

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Start 1 | Start 2 | Length | CMD ID(Not use) | Operating | CMD | 数据 |
| 0xf0 | 0x55 | Protocol Length except start or end | 用于指示命令index(Master device used for detect if COM is [asynchronous](http://dict.youdao.com/w/asynchronous/" \l "keyfrom=E2Ctranslation)) | 0x02 execute 0x01 query | Detail CMD for  Execute and Query | Parameter for CMD |

QCoo has six faces they are marked as 0x01,、0x02、0x03、0x04、0x05、0x06

QCoo has 30 color saved in local storage marked as: 0x00~0x29

QCoo has 256 brightness level marked as :0x00~0xFF(Brightness less than 10 marked as 10)

QCoo has a hardware serial port and communication baud rate is 9600

### Three 、Control LED method One ： 0x41

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Start Code | Length | CMD ID | Operating | CMD | Color Index | LED Index |
| 0xF0 0x55 | 0x05 | 0x00 | 0x02 | 0x41 | 0x01 | 0x7D |

Send date F05505410241017D to QCoo Via serial port

1. What you will see：Number 125(LED Index 0x07) LED will be lighted and it’s color is Color Index 1(0x01);CMD 0x41 means Control LED Method One;
2. Return Value : None
3. Notice :this CMD especially suitable for single led operating ,and this CMD is used to control snake (QCoo game );

### Four 、Control LED method Two ： 0x11

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Start Code | Length | CMD ID | Operation | CMD | Face ID | Color  ID | Data 1 | Data 2 | Data 3 | Data 4 |
| 0XF0  0x55 | 0x09 | 0x00 | 0x02 | 0x11 | 0x01 | 0x01 | 0x01 | 0x02 | 0x02 | 0x01 |

Send Data F05509000211010101020201 to QCoo via serial port :

1. Effect ：There will be some LEDs are lighted in color 1(Color ID) on face 1(Face ID),CMD 0x11 means control LED method two ;
2. Parameter ：data 1 to data 4 stands for led in one face they are marked as 0 or 1;0 means dime ,1 means light .
3. Return Value ：None
4. Notice：About the data 1 to data 4 detail meanings QCoo Team made a Software on how to easily make your LEDs;

### Five 、Control Method Three ： 0x14

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Start Code | Length | CMD ID | Operating | CMD | Face ID | Color ID |
| 0xF0 0x55 | 0x05 | 0x00 | 0x02 | 0x14 | 0x01 | 0x12 |

Send Data F055050002130112 to QCoo via serial port :

1. Effect：All the LEDs color in face1 turn to color index 0x12;This CMD means face color change
2. Return Value ：None
3. Notice: this CMD suit for face color changing .

### Six、fresh display ： 0x03

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Start Code | Length | CMD ID | Operating | CMD |
| 0xF0 0x55 | 0x03 | 0x00 | 0x02 | 0x03 |

Send CMD F05503000203 to QCoo serial port :

1. Effect ：fore fresh current date to display
2. Parameter ：No Parameter 。
3. Return Value ：None
4. Notice ：This CMD is not used frequently ,because every CMD has Fresh Function .

### Seven 、Brightness Setting ： 0x20

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Start Code | Length | CMD ID | Operation | CMD | Parameter |
| 0xF0 0x55 | 0x04 | 0x00 | 0x02 | 0x04 | 0x20 |

Send CMD F0550400020420 to QCoo serial port :

1. Effect ：while QCoo received the CMD Brightness will be changed to 0x20 (0x00-0xff)
2. Parameter ：Brightness set to 0x20(HEX) means 32(DEC )
3. Return Value ：F0 55 01 00 10 0D 0A(means execute successfully )
4. Notice ：Brightness setting will fresh immediately ,when parameter set to 0x00 ,QCoo will not execute ,for the minimum brightness is 0x0A(HEX).

### Eight 、Change Effect ： 0x05

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Start Code | Length | CMD ID | Operation | CMD | Parameter |
| 0xF0 0x55 | 0x04 | 0x00 | 0x02 | 0x05 | 0x01 |

Send CMD F0550400020501 to QCoo Serial port :

1. Effect ：Switch to Effect Mode ,and current mode is Effect 0x01,CMD 0x05 means Change Effect .

Parameter ：there are four effect ,and effect 0x00 means quite effect Mode ;

1. Return ：F0 55 01 00 10 0D 0A(execute successfully )
2. Notice ：you have to send F0550400020500 to quite effect mode if you want make other display .

### Nine 、Power ： 0x15

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Start Code | Length | CMD ID | Operation | CMD | Parameter |
| 0xF0 0x55 | 0x04 | 0x00 | 0x02 | 0x05 | 0x0A |

Send F055040002050A to QCoo serial port:

1. Effect：if CMD is received by QCoo,All the QCoo faces will be turn Red and power of for few seconds.
2. Parameter：Parameter 0x0A has no meanings,0x0A prevent parsing CMD with Mistake.
3. Return Value ：F0 55 01 00 10 0D 0A
4. Notice ：If you have power off the QCoo,you have to shake it to power on ,or all the operation will not be responsed.

### Ten 、Moter Shake : 0x16

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Start Code | Length | CMD ID | Operation | CMD | Shake Strength | Duration |
| 0xF0 0x55 | 0x05 | 0x00 | 0x02 | 0x16 | 0x7D | 0xFF |

发送F055050002167DFF给QCoo 硬件：

1. 效果：接到指令后马达开始震动，震动的强度为0x7D，震动持续时间为0xFF；
2. 参数：震动强度从0x00~0xFF，震动依次增强，震动持续时间从0x00~0xFF依次增长。
3. 返回值：F0 55 01 00 10 0D 0A
4. 注意：马达震动为独立行为，不影响其他指令执行。

### Eleven 、Set Connection ： 0x20

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Start Code | Length | CMD ID | Operation | CMD | Parameter |
| 0xF0 0x55 | 0x04 | 0x00 | 0x02 | 0x020 | 0x01 |

Sned CMD F0550400022001 to QCoo serial port

1. Effect：QCoo will work normal until received this CMD。
2. Parameter ：Parameter 0x01means establish connection and Parameter 0x00 means Smart Phone cut the connection initially
3. Return Value ：F0 55 01 00 10 0D 0A(execute successfully )
4. Notice ：All the CMD will not work until Connection is established .while in new firmware ,you can jump the connection ,send CMD directory ,and if you power on QCoo and don’t connect it to Smart Phone or don’t touch it for 3 minutes ,QCoo will turn itself off automatically .

### Twelve 、Save Brightness ： 0x45

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Start Code | Length | CMD ID | Operation | CMD | Parameter |
| 0xF0 0x55 | 0x04 | 0x00 | 0x02 | 0x045 | 0x3C |

Send CMD F055040002453C to QCoo serial port :

1. Effect：There will no effect on QCoo,this operation only save the brightness value to EEPROM ,after you power off the QCoo ,the brightness value will not lost.
2. Parameter ：stands for brightness value ,from 0x00-0xff (in fact from 0x0A)
3. Return Value ：F0 55 01 00 10 0D 0A(execute successfully)
4. Notice ：This value will be store into QCoo ,every time QCoo power on,it will take the brightness value as default brightness setting value.

### Thirteen 、Dice Mode ： 0x42

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Start Code | Length | CMD ID | Operation | CMD | Parameter |
| 0xF0 0x55 | 0x04 | 0x00 | 0x02 | 0x042 | 0x01 |

Send CMD F0550400024201to QCoo serial port

1. Effect：Into Dice Mode ,you can play QCoo as a dice.
2. Parameter ：0x01 means step into Dice Mode ,0x00 means quite Dice Mode .
3. Return Value ：F0 55 01 00 10 0D 0A
4. Notice ：if you want exit dice Mode you have to send F0550400024201to quite .

### Fourteen 、initialize Gyro ： 0x43

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Start Code | Length | CMD ID | Operation | CMD | Parameter |
| 0xF0 0x55 | 0x04 | 0x00 | 0x02 | 0x043 | 0x01 |

Send CMD F0550400024301 to QCoo serial port:

1. Effect ：QCoo will initialize gyro in setup function initially 。
2. Parameter ：0x01 has no meaning ,0x01 prevent parsing error
3. Return Value ：F0 55 01 00 10 0D 0A
4. Notice ：IIC can stop ,if you in Effect Mode ,so we have to reinitialize the IIC Bus .

### Fifteen 、Query Voltage ： 0x17

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 起始码 | 长度标识 | 命令ID | 动作 | 命令字 | 参数 |
| 0xF0 0x55 | 0x04 | 0x00 | 0x02 | 0x017 | 0x0A |

发送F055040002170A 给QCoo 硬件：

1. 效果：无实际效果，在APP端会收到蓝牙的Notify信息，内容为当前QCoo 电压，形式为字符串
2. 参数：0x0A无实际意义，只是为了防止误触发
3. 返回值：电压值，例如：4.2；此返回值为字符串模式
4. 注意：这个电压值可以大致反映电池的电量状态，接收注意是字符串类型。

### Sixteen 、查询充电状态 ： 0x18

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 起始码 | 长度标识 | 命令ID | 动作 | 命令字 | 参数 |
| 0xF0 0x55 | 0x04 | 0x00 | 0x02 | 0x018 | 0x0A |

发送F055040002180A 给QCoo 硬件：

1. 效果：无实际效果，在APP端会收到蓝牙的Notify信息，内容为当前QCoo 的充电状态，形式为字符串。
2. 参数：0x0A无实际意义，只是为了防止误触发。
3. 返回值：充电状态数值，“0”代表没有在充电，“1”代表在充电。
4. 注意：APP上没使用该指令，仅供开发者参考，配合电压查询的话可以预判电池充电状态（饱和或者在充电）