# 蓝牙BLE数据传输协议

*说明：本协议文档只用于规定蓝牙数据传输协议格式，而不用于蓝牙控制命令格式。*

*版本：0.1*

*日期：2020-02-20*

*编写：董露*

1. 传输模式
2. 由于APP下发数据可能丢包，因此对APP发送的所有数据类型使用同一个character，采用带ACK的传输方式。
3. 数据包格式

2.1 APP发送数据包：

|  |  |  |  |
| --- | --- | --- | --- |
| VendorId | CommandId | Header | Data |
| 2 bytes | 2 bytes | 2 bytes | 待定 |

2.2 Header格式

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Bytes | 0 | | | | | | | | 1 | | | | | | | |
| bits | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| domain | index | | | | | | | | sessionid | | | | type | | flag | |
| index | 包序号，所有数据类型维护同一个index，用于ACK控制和丢包重传，每包发送时+1。 | | | | | | | | | | | | | | | |
| session id | 会话session id，每发起一次新的会话(文件)传输该session id+1，接收端用于检测所接收数据属于哪一个会话； | | | | | | | | | | | | | | | |
| type | 00: 类型  01-11：保留 | | | | | | | | | | | | | | | |
| flag | 00: 开始一次数据传输过程  10: 结束一次数据传输过程  11: 数据发送过程中  00: 保留 | | | | | | | | | | | | | | | |

1. 设备ACK格式，命令(待定义)+数据

3.1 设备发送ACK：

|  |  |  |
| --- | --- | --- |
| VendorId | CommandId | ACK |
| 2 bytes | 2 bytes | 8 bytes |

3.2 ACK格式

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| bytes | 0 | | | | | | | | 1 | 2 | 3-7 |
| bits | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | 7-0 | 7-0 |  |
| domain | session id | | | | 保留 | | | | index | len | mask |
| index | ACK的包序号，含义是此序号之前的包都已经收到 | | | | | | | | | | |
| session id | 和app发送的session id保持一致 | | | | | | | | | | |
| len | mask的有效长度，以bit为单位，预留5个字节，最大值不可超过40。例如len等于10代表mask 第0字节和第1字节的bit0和bit1有效其余mask位无意义 | | | | | | | | | | |
| mask | 5字节mask，由len的值来标记有效位数（前len个bit有效），有效bit中:  0：没有收到包  1：已收到包  按发送的字节序  第0字节的bit0 表示第0包有没有收到 bit1 表示第1包有没有收到 依次类推bit7 表示第7包有没有收到  第1 字节的bit0 表示第8包有没有收到bit1 表示第9包有没有收到 bit7表示第15包有没有收到 | | | | | | | | | | |

1. 校验
   1. App发送数据

|  |  |  |
| --- | --- | --- |
| VendorId | CommandId | Check sum |
| 2 bytes | 2 bytes | 4 bytes，低位在前 |

* 1. 耳机校验返回

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| bytes | 0 | | | | | | | | 1 |
| bits | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |  |
| domain | session id | | | | 保留 | | | | Value |
| Value | 1：发送失败  0：发送成功 | | | | | | | | |

/\* 升级文件 \*/

#define FILE\_NAME "/rwfs/firmware.bin"

/\* 标记升级文件是否下载成功 \*/

#define FILE\_NAME\_OK "/rwfs/firmware\_ok.bin"

FILE\_NAME\_OK: 用于标记FILE\_NAME文件下发的完整性，如果读取FILE\_NAME\_OK文件的第一个字节为0说明FILE\_NAME文件不能使用，如果为1说明可以使用。

1. 上传数据到手机APP
   1. 传输协议，APP发送数据包：

|  |  |  |
| --- | --- | --- |
| VendorId | CommandId | Header |
| 2 bytes | 2 bytes | 2 bytes |

* 1. Header格式

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Bytes | 0 | | | | | | | | 1 | | | | | | | |
| bits | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| domain | index | | | | | | | | sessionid | | | | type | | flag | |
| index | 包序号，所有数据类型维护同一个index，用于ACK控制和丢包重传，每包发送时+1。 | | | | | | | | | | | | | | | |
| session id | 会话session id，每发起一次新的会话(文件)传输该session id+1，接收端用于检测所接收数据属于哪一个会话； | | | | | | | | | | | | | | | |
| type | 00: 类型  01-11：保留 | | | | | | | | | | | | | | | |
| flag | 00: 开始一次数据传输过程  10: 结束一次数据传输过程  11: 数据发送过程中  00: 保留 | | | | | | | | | | | | | | | |

* 1. 耳机发送数据到手机APP

|  |  |  |  |
| --- | --- | --- | --- |
| VendorId | CommandId | Header | Data |
| 2 bytes | 2 bytes | 2 bytes | 数据 |

3.2 Header格式

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Bytes | 0 | | | | | | | | 1 | | | | | | | |
| bits | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| domain | index | | | | | | | | sessionid | | | | type | | flag | |
| index | 包序号，所有数据类型维护同一个index，用于ACK控制和丢包重传。 | | | | | | | | | | | | | | | |
| session id | 会话session id，每发起一次新的会话(文件)传输该session id+1，接收端用于检测所接收数据属于哪一个会话； | | | | | | | | | | | | | | | |
| type | 00: 包内传输  01：换包传输 | | | | | | | | | | | | | | | |
| flag | 00: 开始一次数据传输过程  10: 结束一次数据传输过程  11: 数据发送过程中  00: 保留 | | | | | | | | | | | | | | | |