MCU与SoC通信协议

修改历史记录

|  |  |  |  |
| --- | --- | --- | --- |
| **修改日期** | **版本号** | **修改描述** | **修改人** |
| 2021-03-29 | V0.01 | 初始版本  1、依据E02系统初版文档定义接口 | 黄辉 |
| 2021-04-01 | V0.02 | 1. 添加ABS 2. 添加灯光未关 3. 添加PEPS:未检测到钥匙 4. 添加PEPS:钥匙电量低 5. 添加DTC: 请挂入P挡防止溜车 | 黄辉 |
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# 协议描述

## SPI 消息格式

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| DL | MType | MsgID | Data (0..N) | Checksum | Ack |

## SPI 通信参数

* Baudrate
  + 1MHz
* Bit order
  + MSB
* Bit width
  + 16Bit
* Clock PHASE
  + 0
* Clock POLARITY
  + 0

# Action类消息 (0x01)

## 2.1钥匙状态 0x01

|  |  |  |
| --- | --- | --- |
| **Byte number** | **Value** | **Meaning** |
| 0 | 0x00 | DL(high byte) |
| 1 | 0x03 | DL(low byte) |
| 2 | **0x01** | MType |
| 3 | **0x01** | MsgID |
| 4 | 0xNN | **Bit7~ Bit5: Reserved**  **Bit4: IGN 0:Off, 1:On(硬件)**  **Bit3,Bit2: Reserved**  **Bit1, Bit0:钥匙状态 0:OFF1:ACC2:ON3:START** |
| 5 | 0xNN | Checksum(high byte) |
| 6 | 0xNN | Checksum(low byte) |
| 7 | 0x00 | Ack |



## 2.2车灯信号 0x02

|  |  |  |
| --- | --- | --- |
| **Byte number** | **Value** | **Meaning** |
| 0 | 0x00 | DL(high byte) |
| 1 | 0x04 | DL(low byte) |
| 2 | **0x01** | MType |
| 3 | **0x02** | MsgID |
| 4 | 0xNN | **Bit0:左转向灯 0:Off, 1:Active**  **Bit1:右转向灯 0:Off, 1:Active**  **Bit2:危险灯0:Off, 1:Active**  **Bit3:位置灯0:Off, 1:Active**  **Bit4:远光灯0:Off, 1:Active**  **~~Bit5:近光灯0:Off, 1:Active~~**  **~~Bit6:前雾灯0:Off, 1:Active~~**  **~~Bit7:后雾灯0:Off, 1:Active~~** |
| 5 | 0xNN | **~~Bit0:日间行车灯0:Off, 1:Active~~**  **Bit1: reserved**  **Bit2: reserved**  **Bit3: reserved**  **Bit4: reserved**  **Bit5: reserved**  **Bit6: reserved**  **Bit7: reserved** |
| 6 | 0xNN | Checksum(high byte) |
| 7 | 0xNN | Checksum(low byte) |
| 8 | 0x00 | Ack |

## 2.3车门状态 0x03

|  |  |  |
| --- | --- | --- |
| **Byte number** | **Value** | **Meaning** |
| 0 | 0x00 | DL(high byte) |
| 1 | 0x03 | DL(low byte) |
| 2 | **0x01** | MType |
| 3 | **0x03** | MsgID |
| 4 | 0xNN | **Bit0:前左门1:Open, 0:Closed**  **Bit1:前右门1:Open, 0:Closed**  **Bit2:后右门1:Open, 0:Closed**  **Bit3:后左门1:Open, 0:Closed**  **Bit4:引擎盖1:Open, 0:Closed**  **Bit5:后备箱1:Open, 0:Closed**  **Bit6: reserved** |
| 5 | 0xNN | Checksum(high byte) |
| 6 | 0xNN | Checksum(low byte) |
| 7 | 0x00 | Ack |

## 2.4故障信息 0x04

|  |  |  |
| --- | --- | --- |
| **Byte number** | **Value** | **Meaning** |
| 0 | 0x00 | DL(high byte) |
| 1 | 0x04 | DL(low byte) |
| 2 | **0x01** | MType |
| 3 | **0x04** | MsgID |
| 4 | 0xNN | **Bit0: 发动机故障 0:** **熄灭, 1:** **常亮**  **Bit1:发动机排放故障0:No Fault ,1:Fault**  **Bit2: reserved**  **Bit3: reserved**  **Bit4: reserved**  **Bit5: reserved**  **Bit6: reserved**  **Bit7: reserved** |
| 5 | 0xNN | **Bit0:** **reserved**  **Bit1: 蓄电池故障0:熄灭 , 1:常亮**  **Bit2: reserved**  **Bit3: 制动液位低0:** **熄灭, 1:** **常亮**  **Bit4: reserved**  **Bit5: reserved**  **Bit6: reserved**  **Bit7: reserved** |
| 5 | 0xNN | Checksum(high byte) |
| 6 | 0xNN | Checksum(low byte) |
| 7 | 0x00 | Ack |

## 2.5报警信息 0x05

|  |  |  |
| --- | --- | --- |
| **Byte number** | **Value** | **Meaning** |
| 0 | 0x00 | DL(high byte) |
| 1 | 0x06 | DL(low byte) |
| 2 | **0x01** | MType |
| 3 | **0x05** | MsgID |
| 4 | 0xNN | **Bit0: 主驾驶安全带0：系1：未系**  **Bit1: 副驾驶安全带0：系1：未系**  **Bit2：reserved**  **Bit3：机油压力0：灭1：亮**  **Bit4：reserved**  **Bit5: reserved**  **Bit6：reserved**  **Bit7：reserved** |
| 5 | 0xNN | **Bit0:燃油低0：灭1：亮**  **Bit2：水温高0：灭1：亮** |
| 6 | 0xNN | **Bit0: reserved**  **Bit1: reserved**  **Bit2: ABS 0：熄灭 1：常亮**  **Bit3: reserved**  **Bit4：****小灯未关提示： 0：关1：“灯光未关”** |
| 7 | 0xNN | **Bit0：reserved** |
| 8 | 0xNN | Checksum(high byte) |
| 9 | 0xNN | Checksum(low byte) |
| 10 | 0x00 | Ack |

## 2.6电子手刹系统（EPB） 0x06

|  |  |  |
| --- | --- | --- |
| **Byte number** | **Value** | **Meaning** |
| 0 | 0x00 | DL(high byte) |
| 1 | 0x04 | DL(low byte) |
| 2 | **0x01** | MType |
| 3 | **0x06** | MsgID |
| 4 | 0xNN | **Bit1，Bit0:** **EPB\_Redwarning**  **00：灭**  **01：亮**  **Bit3,Bit2: EPB\_Bluewarning**  **00：灭**  **01：亮**  **Bit5，Bit4：AUTO HOLD blue**  **00:灭**  **01:亮**  **Bit6,Bit7: AUTO HOLD red**  **00:灭**  **01:亮** |
| 5 | 0xNN | **Bit1，Bit0:** **AEB\_Redwarning**  **00：灭**  **01：亮**  **Bit3,Bit2: AEB \_Yellowwarning**  **00：灭**  **01：亮** |
| 6 | 0xNN | Checksum(high byte) |
| 7 | 0xNN | Checksum(low byte) |
| 8 | 0x00 | Ack |

## ~~2.7 0x07~~

## ~~2.8 0x08~~

## 2.9 PEPS0x09

|  |  |  |
| --- | --- | --- |
| **Byte number** | **Value** | **Meaning** |
| 0 | 0x00 | DL(high byte) |
| 1 | 0x04 | DL(low byte) |
| 2 | **0x01** | MType |
| 3 | **0x09** | MsgID |
| 4 | 0xNN | **PEPS报警显示内容**  **Bit0：reserved**  **Bit1：reserved**  **Bit2：reserved**  **Bit3：reserved**  **Bit4：未检测到智能钥匙 0：关闭 1开启**  **Bit5：智能钥匙电量低 0：关闭 1开启**  **Bit6：reserved**  **Bit7：reserved** |
| 5 | 0xNN | **Bit0：reserved**  **Bit1：reserved**  **Bit2~Bit7：reserved** |
| 6 | 0xNN | Checksum(high byte) |
| 7 | 0xNN | Checksum(low byte) |
| 8 | 0x00 | Ack |

## ~~2.10 0x0A~~

### 2.10.1变速箱挡位

|  |  |  |
| --- | --- | --- |
| **Byte number** | **Value** | **Meaning** |
| 0 | 0x00 | DL(high byte) |
| 1 | 0x03 | DL(low byte) |
| 2 | **0x01** | MType |
| 3 | **0x0A** | MsgID |
| 4 | **0xNN** | **0x0:NO Display**  **0x1:Display P**  **0x2:Display R**  **0x3:Display N:**  **0x4:Display D**  **0x5:Display M1**  **0x6:Display M2**  **0x7:Display M3**  **0x8:Display M4**  **0x9:Display M5**  **0xA:Display M6**  **0xB:Display M7**  **0xC:Low**  **0xD:Display M1+**  **0xE:Display M2+**  **0xF:Display M3+**  **0x10:Display M4+**  **0x11:Display M5+**  **0x12:Display M6+**  **0x13:** **Display M7+**  **0x14:Display M2-**  **0x15:Display M3-**  **0x16:Display M4-**  **0x17:Display M5-**  **0x18:Display M6-**  **0x19:Display M7-**  **0x1A: Display M8**  **0x1B:** **Display M9**  **0x1C:** **Display M8+**  **0x1D:** **Display M8-**  **0x1E:** **Display M9-** |
| 5 | 0xNN | Checksum(high byte) |
| 6 | 0xNN | Checksum(low byte) |
| 7 | 0x00 | Ack |

## ~~2.11 0x0B~~

## ~~2.12 0x0C~~

## ~~2.13 0X0D~~

## ~~2.14 0x0E~~

## 2.15安全气囊 0x0F

|  |  |  |
| --- | --- | --- |
| **Byte number** | **Value** | **Meaning** |
| 0 | 0x00 | DL(high byte) |
| 1 | 0x03 | DL(low byte) |
| 2 | **0x01** | MType |
| 3 | **0x0F** | MsgID |
| 4 | 0xNN | **ABM：**  **0:** **灭**  **1:** **亮** |
| 5 | 0xNN | Checksum(high byte) |
| 6 | 0xNN | Checksum(low byte) |
| 7 | 0x00 | Ack |

## 2.16 ~~0x10~~

## 2.17车道偏离指示灯及报警提示0x11

|  |  |  |
| --- | --- | --- |
| **Byte number** | **Value** | **Meaning** |
| 0 | 0x00 | DL(high byte) |
| 1 | 0x03 | DL(low byte) |
| 2 | **0x01** | MType |
| 3 | **0x11** | MsgID |
| 4 | 0xNN | **LDW工作指示灯及报警提示:**  **Bit2~Bit0:**  **000: 无**  **001: reserved**  **010: 绿色指示灯常亮**  **011：reserved**  **100：reserved**  **101：红色指示灯常亮** |
| 5 | 0xNN | Checksum(high byte) |
| 6 | 0xNN | Checksum(low byte) |
| 7 | 0x00 | Ack |
|  |  |  |

## 2.18胎压故障报警 0x12

|  |  |  |
| --- | --- | --- |
| **Byte number** | **Value** | **Meaning** |
| 0 | 0x00 | DL(high byte) |
| 1 | 0x03 | DL(low byte) |
| 2 | **0x01** | MType |
| 3 | **0x12** | MsgID |
| 4 | 0xNN | **0: OFF**  **1: 报警灯常亮** |
| 5 | 0xNN | Checksum(high byte) |
| 6 | 0xNN | Checksum(low byte) |
| 7 | 0x00 | Ack |
|  |  |  |

## ~~2.19 0x13~~

## ~~2.20 0x14~~

## ~~2.21 0x15~~

## ~~2.22 0x16~~

## ~~2.23 0x17~~

## ~~0x18~~

## ~~2.25 0x19~~

## ~~2.25 0x1A~~

## 2.26 DTC文字提示0x1B

|  |  |  |
| --- | --- | --- |
| **Byte number** | **Value** | **Meaning** |
| 0 | 0x00 | DL(high byte) |
| 1 | 0x04 | DL(low byte) |
| 2 | **0x01** | MType |
| 3 | **0x1B** | MsgID |
| 4 | 0xNN | **Bit0~Bit7：reseved** |
| 5 | 0xNN | **Bit0~Bit5：reseved**  **Bit6：请挂入 P 挡防止溜车 0：off；1：on**  **Bit7：reseved** |
| 6 | 0xNN | Checksum(high byte) |
| 7 | 0xNN | Checksum(low byte) |
| 8 | 0x00 | Ack |

## ~~2.25 0x1C~~

## 2.26燃油液位低 0x1D

|  |  |  |
| --- | --- | --- |
| **Byte number** | **Value** | **Meaning** |
| 0 | 0x00 | DL(high byte) |
| 1 | 0x04 | DL(low byte) |
| 2 | **0x01** | MType |
| 3 | **0x1D** | MsgID |
| 4 | 0xNN | **燃油液位低指示灯**  **0X00：灭**  **0X01：亮** |
| 5 | 0xNN | **reserved** |
| 6 | 0xNN | Checksum(high byte) |
| 6 | 0xNN | Checksum(low byte) |
| 7 | 0x00 | Ack |

## ~~2.27 0x1E~~

## ~~2.28 0x1F~~

# Data类消息 (0x02)



## 车速、发动机转速 0x01

|  |  |  |
| --- | --- | --- |
| **Byte number** | **Value** | **Meaning** |
| 0 | 0x00 | DL(high byte) |
| 1 | 0x06 | DL(low byte) |
| 2 | **0x02** | MType |
| 3 | **0x01** | MsgID |
| 4 | 0xNN | **车速(H)** |
| 5 | 0xNN | **车速(L)** |
| 6 | 0xNN | **发动机转速(H)** |
| 7 | 0xNN | **发动机转速(L)** |
| 8 | 0xNN | Checksum(high byte) |
| 9 | 0xNN | Checksum(low byte) |
| 10 | 0x00 | Ack |

注：车速有效范围0~260km/h, Speed = (D)\*0.1；转速有效范围0~8000r/min.

## 燃油量0x02

### 燃油量

|  |  |  |
| --- | --- | --- |
| **Byte number** | **Value** | **Meaning** |
| 0 | 0x00 | DL(high byte) |
| 1 | 0x04 | DL(low byte) |
| 2 | **0x02** | MType |
| 3 | **0x02** | MsgID |
| 4 | 0xNN | **燃油量** |
| 5 | 0xNN | **显示段** |
| 6 | 0xNN | Checksum(high byte) |
| 7 | 0xNN | Checksum(low byte) |
| 8 | 0x00 | Ack |

注：燃油量有效范围0~100, Unit:%.

## 发动机冷却液温度 0x03

|  |  |  |
| --- | --- | --- |
| **Byte number** | **Value** | **Meaning** |
| 0 | 0x00 | DL(high byte) |
| 1 | 0x04 | DL(low byte) |
| 2 | **0x02** | MType |
| 3 | **0x03** | MsgID |
| 4 | 0xNN | **Bit7~Bit0:发动机冷却液温度(高8位)** |
| 5 | 0xNN | **Bit7~Bit4：发动机冷却液温度(低4位)**  **Bit3：**  **0：冷却液数据有效 1：冷却液数据失效**  **Bit2:**  **0：冷却液数据无超时 1 ：冷却液数据超时**  **Bit1~Bit0：reserved** |
| 6 | 0xNN | **显示段** |
| 6 | 0xNN | Checksum(high byte) |
| 7 | 0xNN | Checksum(low byte) |
| 8 | 0x00 | Ack |

注：发动机冷却液温度有效范围-48~142.5℃, Temp = (D)\*0.1, 高8位中Bit7为符号位,1:负温度。

## 里程累计 0x04

|  |  |  |
| --- | --- | --- |
| **Byte number** | **Value** | **Meaning** |
| 0 | 0x00 | DL(high byte) |
| 1 | 0x05 | DL(low byte) |
| 2 | **0x02** | MType |
| 3 | **0x04** | MsgID |
| 4 | 0xNN | **总计里程(H)** |
| 5 | 0xNN | **总计里程(M)** |
| 6 | 0xNN | **总计里程(L)** |
| 7 | 0xNN | Checksum(high byte) |
| 8 | 0xNN | Checksum(low byte) |
| 9 | 0x00 | Ack |

注：里程累计有效范围0~999999km, 超出范围时显示“Error”.

## 里程小计 0x05

|  |  |  |
| --- | --- | --- |
| **Byte number** | **Value** | **Meaning** |
| 0 | 0x00 | DL(high byte) |
| 1 | 0x06 | DL(low byte) |
| 2 | **0x02** | MType |
| 3 | **0x05** | MsgID |
| 4 | 0xNN | **里程小计标识**  **0x00: trip** |
| 5 | 0xNN | **里程小计(高8位)** |
| 6 | 0xNN | **里程小计(中8位)** |
| 7 | 0xNN | **里程小计(低8位)** |
| 8 | 0xNN | Checksum(high byte) |
| 9 | 0xNN | Checksum(low byte) |
| 10 | 0x00 | Ack |

注：里程小计有效范围0.0～9999.9km, mileage = (D)\*0.1.

## 续航里程 0x06

|  |  |  |
| --- | --- | --- |
| **Byte number** | **Value** | **Meaning** |
| 0 | 0x00 | DL(high byte) |
| 1 | 0x04 | DL(low byte) |
| 2 | **0x02** | MType |
| 3 | **0x06** | MsgID |
| 4 | 0xNN | **续航里程(H)** |
| 5 | 0xNN | **续航里程(L)** |
| 6 | 0xNN | Checksum(high byte) |
| 7 | 0xNN | Checksum(low byte) |
| 8 | 0x00 | Ack |

注：FX11:续航里程有效范围0~999.9km, FX11E续航里程显示范围0-1600km

mileage = (D)\*0.1. 无效值0xFFFF时显示---km.

## 平均油耗0x07

### 平均油耗

|  |  |  |
| --- | --- | --- |
| **Byte number** | **Value** | **Meaning** |
| 0 | 0x00 | DL(high byte) |
| 1 | 0x04 | DL(low byte) |
| 2 | **0x02** | MType |
| 3 | **0x07** | MsgID |
| 4 | 0xNN | **平均油耗 (H)** |
| 5 | 0xNN | **平均油耗 (L)** |
| 6 | 0xNN | Checksum(high byte) |
| 7 | 0xNN | Checksum(low byte) |
| 8 | 0x00 | Ack |

注：0.0 - 99.9 L/100km,平均油耗= (D)\*0.1；无效值0xFFFF时显示--.-L/100km.

## 瞬时油耗0x08

### 瞬时油耗

|  |  |  |
| --- | --- | --- |
| **Byte number** | **Value** | **Meaning** |
| 0 | 0x00 | DL(high byte) |
| 1 | 0x04 | DL(low byte) |
| 2 | **0x02** | MType |
| 3 | **0x08** | MsgID |
| 4 | 0xNN | **瞬时油耗(H)** |
| 5 | 0xNN | **瞬时油耗(L)** |
| 6 | 0xNN | Checksum(high byte) |
| 7 | 0xNN | Checksum(low byte) |
| 8 | 0x00 | Ack |

注：0.0 - 99.9 L/100km,瞬时油耗= (D)\*0.1；无效值0xFFFF时显示--.-L/100km.

## 环境温度 0x09

|  |  |  |
| --- | --- | --- |
| **Byte number** | **Value** | **Meaning** |
| 0 | 0x00 | DL(high byte) |
| 1 | 0x07 | DL(low byte) |
| 2 | **0x02** | MType |
| 3 | **0x09** | MsgID |
| 4 | 0xNN | **车内温度(H)** |
| 5 | 0xNN | **车内温度(L)** |
| 6 | 0xNN | **室外温度(H)** |
| 7 | 0xNN | **室外温度(L)** |
| 8 | 0xNN | **温度单位0:℃,1:℉** |
| 9 | 0xNN | Checksum(high byte) |
| 10 | 0xNN | Checksum(low byte) |
| 11 | 0x00 | Ack |

注：**室外**温度有效范围-40~85℃, Temp = (D)\*0.1, 无效值为0xFFFF，高8位中Bit7为符号位,1:负温度.

## ~~0x0A~~

## ~~0x0B~~

## 胎压 0x0C

|  |  |  |
| --- | --- | --- |
| **Byte number** | **Value** | **Meaning** |
| 0 | 0x00 | DL(high byte) |
| 1 | 0x13 | DL(low byte) |
| 2 | **0x02** | MType |
| 3 | **0x0C** | MsgID |
| 4 | 0xNN | **左前轮胎压(H)** |
| 5 | 0xNN | **左前轮胎压(L)** |
| 6 | 0xNN | **右前轮胎压(H)** |
| 7 | 0xNN | **右前轮胎压(L)** |
| 8 | 0xNN | **左后轮胎压(H)** |
| 9 | 0xNN | **左后轮胎压(L)** |
| 10 | 0xNN | **右后轮胎压(H)** |
| 11 | 0xNN | **右后轮胎压(L)** |
| 12 | 0xNN | **左前轮胎故障** |
| 13 | 0xNN | **右前轮胎故障** |
| 14 | 0xNN | **左后轮胎故障** |
| 15 | 0xNN | **右后轮胎故障** |
| 16 | 0xNN | **前左轮胎温** |
| 17 | 0xNN | **前右轮胎温** |
| 18 | 0xNN | **后左轮胎温** |
| 19 | 0xNN | **后右轮胎温** |
| 20 | 0xNN | **胎压系统警告**  **0:No any error.**  **1:System error.** |
| 21 | 0xNN | Checksum(high byte) |
| 22 | 0xNN | Checksum(low byte) |
| 23 | 0x00 | Ack |

注：胎压数据有效范围0~4.5bar, pressure = (D)\*0.1，无效值0xFFFF时，显示-.-;胎温数据有效范围-40~125℃，高8位中Bit7为符号位,1:负温度，无效值0xFF时，--。;

胎压警告类型0x0:Normal，0x1:Rapid Air Loss，0x2:Low Pressure，0x4:High Pressure，0x5:High Temperature，0x6:Error Mode，0x7:Not used

## ~~0x0D~~

## ~~0x0E~~

## ~~0x0F~~

## ~~0x10~~

## ~~0x11~~

## ~~0x12~~

# Node Alive类消息 (0x03)



## 激活节点 0x01

|  |  |  |
| --- | --- | --- |
| **Byte number** | **Value** | **Meaning** |
| 0 | 0x00 | DL(high byte) |
| 1 | 0x03 | DL(low byte) |
| 2 | **0x03** | MType |
| 3 | **0x01** | MsgID |
| 4 | 0xNN | **0:未激活**  **1:激活** |
| 5 | 0xNN | Checksum(high byte) |
| 6 | 0xNN | Checksum(low byte) |
| 7 | 0x00 | Ack： |

## 心跳 0x02

|  |  |  |
| --- | --- | --- |
| **Byte number** | **Value** | **Meaning** |
| 0 | 0x00 | DL(high byte) |
| 1 | 0x03 | DL(low byte) |
| 2 | **0x03** | MType |
| 3 | **0x02** | MsgID |
| 4 | 0xNN | **0:心跳关闭**  **1:心跳启动** |
| 5 | 0xNN | Checksum(high byte) |
| 6 | 0xNN | Checksum(low byte) |
| 7 | 0x00 | Ack |

## ~~0x03~~

# 互动类消息 (0x04)



## 多媒体音乐 0x01

|  |  |  |
| --- | --- | --- |
| **Byte number** | **Value** | **Meaning** |
| 0 | 0x00 | DL(high byte) |
| 1 | 0xNN | DL(low byte) |
| 2 | **0x04** | MType |
| 3 | **0x01** | MsgID |
| 4 | 0xNN | **子命令**  **0x00：关闭显示**  **0x01:播放进度**  **0x02:专辑名**  **0x03:歌曲名**  **0x04:歌手名** |
| 5 | 0xNN | **数据内容：**  **【0x00】：无**  **【0x01】: 播放进度Playback time / total time**  **【0x02】: 专辑名String of the music name**  **【0x03】: 歌曲名String of the music name**  **【0x04】: 歌手名String of the singer name** |
| 6 | 0xNN | Checksum(high byte) |
| 7 | 0xNN | Checksum(low byte) |
| 8 | 0x00 | Ack |

注：数据内容传输格式为UTF-8，DL最大长度50.

## 电话信息 0x02

|  |  |  |
| --- | --- | --- |
| **Byte number** | **Value** | **Meaning** |
| 0 | 0x00 | DL(high byte) |
| 1 | 0xNN | DL(low byte) |
| 2 | **0x04** | MType |
| 3 | **0x02** | MsgID |
| 4 | 0xNN | **子命令**  **0x00: 清除显示**  **0x01:** **电话状态**  **0x02:** **来电名称**  **0x03:** **来电号码**  **0x04:** **通话时间** |
| 5 | 0xNN | **数据内容**  **【0x00】：无**  **【0x01】电话状态Bluetooth call status:**  **0x0: No call/** Hang up  **0x1: incoming call**  **0x2: dialing call**  0x3: On the phone  **【0x02】来电名称String of the name**  **【0x03】来电号码String of the number**  **【0x04】通话时间String of the time** |
| 6 | 0xNN | Checksum(high byte) |
| 7 | 0xNN | Checksum(low byte) |
| 8 | 0x00 | Ack |

注：数据内容传输格式为UTF-8，DL最大长度50.

## 收音机 0x03

|  |  |  |
| --- | --- | --- |
| Byte number | Value | Meaning |
| 0 | 0x00 | DL(high byte) |
| 1 | 0x06 | DL(low byte) |
| 2 | 0x04 | MType |
| 3 | 0x03 | MsgID |
| 4 | 0xNN | 波段  0x0:Not active  0x1:FM mode  0x2:AM mode |
| 5 | 0xNN | 搜台信号  0x0:Not active  0x1:Normal  0x2:AST |
| 6 | 0xNN | 频率高8位 |
| 7 | 0xNN | 频率低8位 |
| 8 | 0xNN | Checksum(high byte) |
| 9 | 0xNN | Checksum(low byte) |
| 10 | 0x00 | Ack |

注：FM频率有效范围87.5~108Mhz, AM频率有效范围530~1710khz ,Frequance= (D)\*0.1；

波段发送not active时 关闭收音机

## 导航信息1 0x05

|  |  |  |
| --- | --- | --- |
| **Byte number** | **Value** | **Meaning** |
| 0 | 0x00 | DL(high byte) |
| 1 | 0x04 | DL(low byte) |
| 2 | **0x04** | MType |
| 3 | **0x05** | MsgID |
| 4 | 0xNN | **Bit0:导航激活状态0:Off, 1:Active** |
| 5 | 0xNN |  |
| 6 | 0xNN | Checksum(high byte) |
| 7 | 0xNN | Checksum(low byte) |
| 8 | 0x00 | Ack |

## ~~0x06~~

## ~~0x07~~

## 导航信息4 0x08

|  |  |  |
| --- | --- | --- |
| **Byte number** | **Value** | **Meaning** |
| 0 | 0x00 | DL(high byte) |
| 1 | 0x03 | DL(low byte) |
| 2 | **0x04** | MType |
| 3 | **0x08** | MsgID |
| 4 | 0xNN | **转向路口类型**  **TBT地图index对应值** |
| 5 | 0xNN | Checksum(high byte) |
| 6 | 0xNN | Checksum(low byte) |
| 7 | 0x00 | Ack |

注：路口类型为普通路口时，该协议有效。

## 导~~航信息5 0x09~~

|  |  |  |
| --- | --- | --- |
| **Byte number** | **Value** | **Meaning** |
| 0 | 0x00 | DL(high byte) |
| 1 | 0x06 | DL(low byte) |
| 2 | **0x04** | MType |
| 3 | **0x09** | MsgID |
| 4 | 0xNN | **距离类型**  **1:下一路口距离**  **2:目的地距离**  **3:reserved**  **4.剩余时间（秒）** |
| 5 | 0xNN | **信息(H)** |
| 6 | 0xNN | **信息(M)** |
| 7 | 0xNN | **信息(L)** |
| 8 | 0xNN | Checksum(high byte) |
| 9 | 0xNN | Checksum(low byte) |
| 10 | 0x00 | Ack |

注：距离有效范围0~50000, Unit:m.

## 导航信息 0x0A

|  |  |  |
| --- | --- | --- |
| **Byte number** | **Value** | **Meaning** |
| 0 | 0x00 | DL(high byte) |
| 1 | 0xNN | DL(low byte) |
| 2 | **0x04** | MType |
| 3 | **0x0A** | MsgID |
| 5 | 0xNN | **数据内容：**  **下一路口名** |
| 6 | 0xNN | Checksum(high byte) |
| 7 | 0xNN | Checksum(low byte) |
| 8 | 0x00 | Ack |

注：数据内容传输格式为UTF-8，DL最大长度50.

# Setup类消息 (0x05)



## 系统时间 0x01

|  |  |  |
| --- | --- | --- |
| **Byte number** | **Value** | **Meaning** |
| 0 | 0x00 | DL(high byte) |
| 1 | 0x06 | DL(low byte) |
| 2 | **0x05** | MType |
| 3 | **0x01** | MsgID |
| 4 | 0xNN | **时(0-23)** |
| 5 | 0xNN | **分(0-59)** |
| 6 | 0xNN | **制式**  **0x0:12h**  **0x1:24h** |
| 7 | 0xNN | **GPS自动校时**  **0：关闭**  **1：打开** |
| 10 | 0xNN | Checksum(high byte) |
| 11 | 0xNN | Checksum(low byte) |
| 12 | 0x00 | Ack |

注：SoC->MCU发送不带参数命令，即为获取MCU系统时间.

## 软件版本号 0x02

|  |  |  |
| --- | --- | --- |
| **Byte number** | **Value** | **Meaning** |
| 0 | 0x00 | DL(high byte) |
| 1 | 0xNN | DL(low byte) |
| 2 | **0x05** | MType |
| 3 | **0x02** | MsgID |
| 4…N | 0xNN | **软件版本号ASCII** |
| 4+N | 0xNN | Checksum(high byte) |
| 5+N | 0xNN | Checksum(low byte) |
| 6+N | 0x00 | Ack |

注：软件版本号最大为20个字符.

## 0x03

## 背光控制 0x04

|  |  |  |
| --- | --- | --- |
| **Byte number** | **Value** | **Meaning** |
| 0 | 0x00 | DL(high byte) |
| 1 | 0x04 | DL(low byte) |
| 2 | **0x05** | MType |
| 3 | **0x04** | MsgID |
| 4 | 0xNN | **背光开关状态**  **0:关闭**  **1:开启** |
| 5 | 0xNN | **背光亮度等级: 1~10** |
| 6 | 0xNN | Checksum(high byte) |
| 7 | 0xNN | Checksum(low byte) |
| 8 | 0x00 | Ack |

注：系统上电初始化完成后，MCU主动向SoC发送一次背光开关状态及背光等级，屏幕刷新出画面时SoC通知MCU开启背光。

## 硬件版本号 0x05

|  |  |  |
| --- | --- | --- |
| **Byte number** | **Value** | **Meaning** |
| 0 | 0x00 | DL(high byte) |
| 1 | 0xNN | DL(low byte) |
| 2 | **0x05** | MType |
| 3 | **0x05** | MsgID |
| 4…N | 0xNN | **硬件版本号ASCII** |
| 4+N | 0xNN | Checksum(high byte) |
| 5+N | 0xNN | Checksum(low byte) |
| 6+N | 0x00 | Ack |

注：硬件版本号最大为20个字符.

## ~~0x06~~

## ~~0x07~~

## ~~0x08~~

## ~~0x09~~

## 6.10系统配置信息 0x0A

### ~~6.10.1~~

### ~~6.10.2~~

### 6.12主题0x0B

|  |  |  |
| --- | --- | --- |
| **Byte number** | **Value** | **Meaning** |
| 0 | 0x00 | DL(high byte) |
| 1 | 0x04 | DL(low byte) |
| 2 | **0x05** | MType |
| 3 | 0x0B | MsgID |
| 4 | 0xNN | **主题**  **0x01: 主题1**  **0x02：主题2** |
| 6 | 0xNN | Checksum(high byte) |
| 7 | 0xNN | Checksum(low byte) |
| 8 | 0x00 | Ack |

注：默认主题为1

## 6.13语言0x0C

|  |  |  |
| --- | --- | --- |
| **Byte number** | **Value** | **Meaning** |
| 0 | 0x00 | DL(high byte) |
| 1 | 0x04 | DL(low byte) |
| 2 | **0x05** | MType |
| 3 | 0x0C | MsgID |
| 4 | 0xNN | **语言**  **0x1:Chinese**  **0x2:English** |
| 5 | 0xNN | Checksum(high byte) |
| 6 | 0xNN | Checksum(low byte) |
| 7 | 0x00 | Ack |

注：默认语言为中文

# Key类消息 (0x06)



## 按键 0x01

|  |  |  |
| --- | --- | --- |
| **Byte number** | **Value** | **Meaning** |
| 0 | 0x00 | DL(high byte) |
| 1 | 0x04 | DL(low byte) |
| 2 | **0x06** | MType |
| 3 | **0x01** | MsgID |
| 4 | 0xNN | **键码** |
| 5 | 0xNN | **类型:**  **KEY\_TYPE\_IDLE = 0x00,**  **KEY\_TYPE\_PRESS = 0x01,**  **KEY\_TYPE\_LONG\_PRESS = 0x02,**  **KEY\_TYPE\_LONG\_HOLD = 0x04,**  **KEY\_TYPE\_RELEASE = 0x08,**  **KEY\_TYPE\_LONG\_RELEASE = 0x10,**  **KEY\_TYPE\_ERROR = 0x20,** |
| 6 | 0xNN | Checksum(high byte) |
| 7 | 0xNN | Checksum(low byte) |
| 8 | 0x00 | Ack |

**注：键码 0：OK 1: 上翻 2： 下翻 3: 左翻 4： 右翻5: Mode**

# ~~诊断类消息 (0x07)~~



## ~~0x01~~

## ~~0x02~~

## ~~0x03~~

## ~~0x04~~

## ~~0x05~~

## ~~0x06~~

## ~~8.7 0x07~~