**机器人自动乘梯通讯协议**

1. **通讯协议**

RS485接口，半双工，波特率9600bps，8N1。数据为HEX格式。

修改记录：

V1.0:海康威视AGV串口通讯《电梯串口通信协议 - 1》

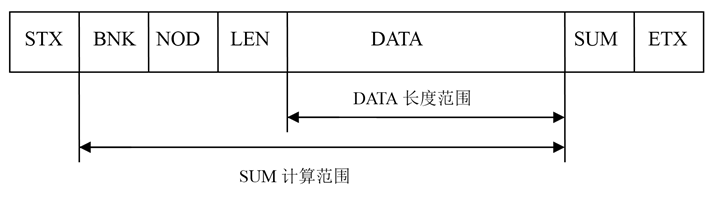
V1.1:在海康威视AGV串口通讯《电梯串口通信协议 - 1》基础上增加了**关门指令**

2019.03.20

V1.2:在京东机器人乘梯通讯协议基础上更改，增加**取消乘梯**指令。2019.03.25

V1.3 在XMT-R1项目上，添加了查询指令,传感器状态。 2020.08.14

### 报文格式



|  |  |  |  |
| --- | --- | --- | --- |
| 符号 | 含义 | 长度（字节） | 内容 |
| STX | 报文头 | 2 | 0xAB 0x66 |
| BNK | 组编号 | 1 | 1号群为0，2号群为1，依此类推 |
| NOD | 设备编号 | 1 | 1号梯为0x00，2号梯为0x01，依此类推 |
| LEN | DATA字节数 | 1 | 根据数据内容确定 |
| DATA | 数据内容 | - | 见后续数据内容说明 |
| SUM | CHECKSUM校验和 | 1 | SUM= ~（BNK+NOD+LEN+DATA）+1 |
| ETX | 报文尾，表示通讯数据结束 | 1 | 0x03 |

### 数据内容

1. **查询电梯状态的命令（200ms查询间隔）**

机器人发送：

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| No | D7 | D6 | D5 | D4 | D3 | D2 | D1 | D0 |
| 1 | 命令字：0x01 | | | | | | | |
| 2 | ID号：0x00～0xFF | | | | | | | |
| 3 | 0xFF | | | | | | | |

电梯反馈：

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| No | D7 | D6 | | D5 | | D4 | | D3 | | D2 | | D1 | | D0 |
| 1 | 命令字：0x81 | | | | | | | | | | | | | |
| 2 | ID号：0x00～0xFF | | | | | | | | | | | | | |
| 3 | 预留 | | | | | | | | | | | | | |
| 4 | 预留 | 电梯所处楼层 | | | | | | | | | | | | |
| 5 | 预留 | 楼层检测1  1生效  0未生效 | 楼层检测2  1生效  0未生效 | | 1层校准  1生效  0未生效 | | 电梯开门  状态  1到位  0未开门 | | 电梯到达  0：没到达  1：到达 | | 电梯下行状态  1有效  0无效 | | 电梯上行状态  1有效  0无效 | |

注：当D0,D1都为0则为停止状态,电梯到达表示已经开门到位。

1. **请求电梯到达目的楼层指令**

机器人发送：

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| No | D7 | D6 | D5 | D4 | D3 | D2 | D1 | D0 |
| 1 | 命令字：0x02 | | | | | | | |
| 2 | ID号：0x00～0xFF | | | | | | | |
| 3 | 预留 | | | | | | | |
| 4 | 前后门  0：前门  1：后门 | 登记楼层 | | | | | | |

电梯发送：

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| No | D7 | D6 | D5 | D4 | D3 | D2 | D1 | D0 |
| 1 | 命令字：0x82 | | | | | | | |
| 2 | ID号：0x00～0xFF | | | | | | | |
| 3 | 预留 | 预留 | 预留 | 预留 | 预留 | 预留 | 预留 | 1为成功  0为失败 |

1. **保持电梯开门状态时发送的开门请求指令（200ms发送间隔）**

机器人发送：

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| No | D7 | D6 | D5 | D4 | D3 | D2 | D1 | D0 |
| 1 | 命令字：0x03 | | | | | | | |
| 2 | ID号：0x00～0xFF | | | | | | | |
| 3 | 预留 | 预留 | 后门开门指令 | 前门开门指令 | 预留 | | | |

注：机器人发送一次开门指令，电梯控制模块控制电梯开门保持20s。

电梯发送：

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| No | D7 | D6 | D5 | D4 | D3 | D2 | | D1 | D0 |
| 1 | 命令字：0x83 | | | | | | | | |
| 2 | ID号：0x00～0xFF | | | | | | | | |
| 3 | 预留 | | | | | | | | |
| 4 | 预留 | 电梯所处楼层 | | | | | | | |
| 5 | 预留 | | | | | | 开门保持状态：  1为成功  0为失败 | 电梯下行状态 | 电梯上行状态 |

1. **关门指令**

机器人发送：

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| No | D7 | D6 | D5 | D4 | D3 | D2 | D1 | D0 |
| 1 | 命令字：0x04 | | | | | | | |
| 2 | ID号：0x00～0xFF | | | | | | | |
| 3 | 预留 | 预留 | 后门关门指令 | 前门关门指令 | 预留 | 预留 | 预留 | 退出专用模式 |

电梯发送：

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| No | D7 | D6 | D5 | D4 | D3 | D2 | | D1 | D0 |
| 1 | 命令字：0x84 | | | | | | | | |
| 2 | ID号：0x00～0xFF | | | | | | | | |
| 3 | 预留 | | | | | | | | |
| 4 | 预留 | 电梯所处楼层 | | | | | | | |
| 5 | 预留 | | | | | | 与电梯通信状态  （保留不用） | 电梯下行状态 | 电梯上行状态 |

1. **取消指令（希格斯专用）**

机器人发送：

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| No | D7 | D6 | D5 | D4 | D3 | D2 | D1 | D0 |
| 1 | 命令字：0x05 | | | | | | | |
| 2 | ID号：0x00～0xFF | | | | | | | |
| 3 | 预留 | 预留 | 预留 | 预留 | 预留 | 预留 | 预留 | 预留 |

电梯发送：

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| No | D7 | D6 | D5 | D4 | D3 | D2 | | D1 | D0 |
| 1 | 命令字：0x85 | | | | | | | | |
| 2 | ID号：0x00～0xFF | | | | | | | | |
| 3 | 预留 | | | | | | | | |
| 4 | 预留 | 电梯所处楼层 | | | | | | | |
| 5 | 预留 | | | | | | 取消状态  1为成功  0为失败 | 电梯下行状态 | 电梯上行状态 |

备注：

1. 电梯默认20s超时关门，在20s周期内收到开门保持则重置20s超时关门，未收到则超时关门。
2. AGV请求后以200ms间隔发送查询指令，电梯到达目的楼层后电梯的上下行标志清零，AGV根据电梯当前楼层和上下行标志为零来判断电梯已经到达了请求楼层。

总结：正常机器人乘梯流程：**AGV登记->**回复请求成功后->间隔发送**查询电梯状态的命令（200ms间隔）收到到达通知后，电梯控制器控制开门按键（20s）->AGV发送开门保持直到AGV出去,或者AGV停止发送开门保持，电梯关门。**

1. **工作流程图：**

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