**企鹅机器人通信协议**

1. **PC发给节点板指令**

企鹅机器人采用速度内环，位置外环进行控制，采用CAN进行通信。共计两帧。

第一帧：0x49

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| CAN ID | | | 有效数据 | |
| DIRTION ID | NODE ID | MSG ID | DATA[0-4] | DATA[4-7] |
| 0X00 | 0X02 | MII\_MSG\_COMMON\_1 | 左电机1 Knee | 左电机1 Hip |

第二帧：0x4A

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| CAN ID | | | 有效数据 | |
| DIRTION ID | NODE ID | MSG ID | DATA[0-4] | DATA[4-7] |
| 0X00 | 0X02 | MII\_MSG\_COMMON\_2 | 右电机1 Knee | 右电机2 Hip |

第三帧：0x4B

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| CAN ID | | | 有效数据 | | | |
| DIRTION ID | NODE ID | MSG ID | DATA[0-1] | DATA[2-3] | DATA[4-5] | DATA[6-7] |
| 0X00 | 0X02 | MII\_MSG\_COMMON\_3 | 左舵机1 | 左舵机2 | 右舵机1 | 右舵机2 |

第四帧：0x4C

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| CAN ID | | | 有效数据 | |
| DIRTION ID | NODE ID | MSG ID | DATA[0-1] | DATA[2-7] |
| 0X00 | 0X02 | MII\_MSG\_COMMON\_4 | 头部舵机 | 圆屏形状 |

注：CAN ID构成形式见qr\_protocol.h

第二帧数据为250-1500

0x49 0x4a

00 00 00 00 e8 03 00 00

00 00 00 00 fa 00 00 00 250

00 00 00 00 ee 02 00 00 750

00 00 00 00 dc 05 00 00 1500

1. **节点板发给PC指令**

第一帧：角度编码器信息

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| CAN ID | | | 有效数据 | | | |
| DIRTION ID | NODE ID | MSG ID | DATA[0-1] | DATA[2-3] | DATA[4-5] | DATA[6-7] |
| 0X1x | 0X02 | MII\_MSG\_HEARTBEAT\_1 | 左腿1 Hip | 左腿2 Knee | 右腿1 Hip | 右腿2 Knee |

第二帧：舵机位置反馈信息

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| CAN ID | | | 有效数据 | | | |
| DIRTION ID | NODE ID | MSG ID | DATA[0-1] | DATA[2-3] | DATA[4-5] | DATA[6-7] |
| 0X1x | 0X02 | MII\_MSG\_HEARTBEAT\_2 | 超声波1 | 超声波2 | 足底1 | 足底2 |

**601**

**23 60 60 00 01 00 00 00 位置模式（当前位置为0）**

**23 40 60 00 06 00 00 00 电机断电**

23 40 60 00 0F 00 00 00 相对位置电机上电

23 7A 60 00 00 00 00 00 0目标位置

23 7A 60 00 20 4E 00 00 20000绝对位置

23 7A 60 00 df 7b 00 00 31711 外最大位置

23 40 60 00 1F 00 00 00 绝对位置生效

23 40 60 00 86 00 00 00

40 63 60 00 00 00 00 00 查询当前位置

23 60 60 00 03 00 00 00 速度模式

23 40 60 00 0F 00 00 00 上电

23 F0 2F 09 F4 01 00 00 500RPM

23 f0 2F 09 e8 03 00 00 1000RPM

23 f0 2F 09 d0 07 00 00 2000rpm

23 f0 2F 09 b8 0b 00 00 3000rpm

左腿编码器值

|  |  |  |  |
| --- | --- | --- | --- |
|  | 内侧 | 中 | 外 |
| Hip | 1635 | 1465 | 1314 |
| Knee | 936 | 682 | 527 |

右腿编码器初值

|  |  |  |  |
| --- | --- | --- | --- |
|  | 内侧 | 中 | 外 |
| Hip | 1302 | 1453 | 1625 |
| Knee | 429 | 626 | 881 |