NAVBOT-ES02

BLE

communication protocol

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Revision History

DOCUMENT HISTORY			
SOFTWARE REVISION	**CHANGES MADE**	**REVISION DATE**	**EDITED BY**
1.0	**First draft**	**6/12/2025**	**XiaoleChen**

1. BLE information

BLE NAME ：
navbot_es02-******

Service UUID:
6E400011-B5A3-F393-E0A9-E50E24DCCA9E

Send data characteristic UUID:
6E400012-B5A3-F393-E0A9-E50E24DCCA9E

Receive data characteristic UUID:
6E400013-B5A3-F393-E0A9-E50E24DCCA9E

2. Data frame agreement

Byte	Name	Description
Byte 1	Header1	**Fixed 0x55**
Byte 2	Header2	**Fixed 0xAA**
Byte 3	**Command**	**The control command of this data frame, reference 3.Command**
Byte 4	**Remaining**	**The number of frames remaining after synthesizing the complete data**
Byte 5	**Null**	**Retain**
Byte 6	Data	
Byte 7	Data	
Byte 8	Data	
Byte 9	Data	
Byte 10	Data	
Byte 11	Data	
Byte 12	Data	
Byte 13	Data	
Byte 14	Data	
Byte 15	Data	
Byte 16	Data	
Byte 17	Data	
Byte 18	Data	
Byte 19	Data	
Byte 20	Data	

3. Command

The third byte is the command byte, which determines the function of the data from the 6th to the 20th byte. The current definition is as follows:

Command	Name	Explanation
0x10	CMD_MANEUVER	Robot maneuver, at this time the meaning of the data frame reference 3.0.CMD_MANEUVER.

3.0. CMD_MANEUVER

When byte3(command) is equal to 0x00, it indicates that bytes 6 to 20 control the maneuverability of the robot. At this time, the data should follow the following rules:

Byte	**Name**	**Description**
Byte 1	**Header1**	**Fixed 0x55**
Byte 2	**Header2**	**Fixed 0xAA**
Byte 3	**Command**	**0x10**
Byte 4	**Remaining**	**0x00**
Byte 5	**Null**	**0x00**
Byte 6	**CH1_roll**	**The robot leans to the left and right. Value 100 to -100.**
Byte 7	**CH2_height**	**The height of the robot. Value 0 to 100 .**
Byte 8	**CH3_pitching**	**Move forward or backward. Value 100 to -100.**
Byte 9	**Ch4_yaw**	**The robot spin. Value 100 to -100.**
Byte 10	**SWA_en**	**3-section switch, 0:stop, 1:start, 2:start and touch tablet enable.**
Byte 11	**SWB_posture**	**2-section switch, 0:posture mode, 1:mark mode.**
Byte 12	**SWC_roll_lock**	**2-section switch, serve posture 2, 0:unlock, 1:lock.**
Byte 13	**SWD_posture_option**	**3-section switch, 0:default, 1:pitching adjust, 2:ball poise.**
Byte 14	**VRA_ball_x**	**The x-coordinate of the small ball. Value 5 to -5.**
Byte 15	**VRB_ball_y**	**The y-coordinate of the small ball. Value 5 to -5.**
Byte 16	**Null**	**0x00**
Byte 17	**Null**	**0x00**
Byte 18	**Null**	**0x00**
Byte 19	**Null**	**0x00**
Byte 20	**Null**	**0x00**

3.0.1. Data frame demonstration：

55 AA 10 00 00　00 00 00 00　01 00 00 00　00 00　00 00 00 00 00
SWA_en(Byte 10)　= 1,
At this point, start the machine and hold it upright with your hand. Then you can stand still on the spot.

55 AA 10 00 00　00 00 0A 00　01 00 00 00　00 00　00 00 00 00 00
SWA_en(Byte 10)　= 1,
CH3_pitching(Byte 8)　= 10,
After standing up, the machine moved forward at a speed of 10.

55 AA 10 00 00　00 00 8A 00　01 00 00 00　00 00　00 00 00 00 00
SWA_en(Byte 10)　= 1,
CH3_pitching(Byte 8)　= -10,
After standing up, the machine moves backward at a speed of 10.

55 AA 10 00 00　00 00 00 08　01 00 00 00　00 00　00 00 00 00 00
SWA_en(Byte 10)　= 1,
Ch4_yaw(Byte 9)　= 8,
After standing up, the machine rotates clockwise at an angular velocity of 8.

55 AA 10 00 00　00 00 00 88　01 00 00 00　00 00　00 00 00 00 00
SWA_en(Byte 10)　= 1,
Ch4_yaw(Byte 9)　= -8,
After standing up, the machine rotates counterclockwise at an angular velocity of 8.