Muto baseboard Communication protocol

Instructions

1. Protocol data is sent in bytes in hexadecimal format.
2. The format of the protocol is: packet header - Length - instruction - address - data - check - packet tail.
3. packet header and packet tail: Protocol packet header: 0x55 0x00, Protocol packet tail: 0x00 0xAA。
4. Length: The number of bytes in a packet.
5. W/R Instruction: Write instruction is 0x01, read instruction is 0x02, data return instruction is 0x12.
6. Address: register operation address.
7. Data: The data written to the register address can be a single data or multiple data.

8. Check: Calculates the sum of all values from the length to the check, takes the lowest byte, and then inverts.
9. XX in the data indicates that the byte data is variable or needs to be calculated.
10. If the data consists of two bytes, the big-end transmission mode is adopted, that is the high byte comes first and the low byte comes last.

Example: Control buzzer, The check =255- (0x09+0x01+0x18+0xFF) %256

header1	header2	length	W/R	addr	data	check	tail1	tail2
0x55	0x00	0x09	0x01	0x18	0xFF	0xDE	0x00	0xAA

Instruction type

Instruction type	header1	header2	length	W/R	addr	data	check	tail1	tail2
Write instruction	0x55	0x00	len	**0x01**	addr	data	check	0x00	0xAA
Read instruction	0x55	0x00	len	**0x02**	addr	data	check	0x00	0xAA
Data return instruction	0x55	0x00	len	**0x12**	addr	data	check	0x00	0xAA

Write instruction

Restore initial state(standing posture)

Control the robot to resume the standing posture.

header1	header2	length	W/R	addr	data	check	tail1	tail2
0x55	0x00	0x09	0x01	0x06	0x00	0xEF	0x00	0xAA

Squat

Control the robot to squat and land on the bottom to reduce the power consumption of the steering gear

header1	header2	length	W/R	addr	data	check	tail1	tail2
0x55	0x00	0x09	0x01	0x10	0x00	0xE5	0x00	0xAA

Stop/put leg to land

Control the robot to stop moving and put its feet on the ground.

header1	header2	length	W/R	addr	data	check	tail1	tail2
0x55	0x00	0x09	0x01	0x11	0x00	0xE4	0x00	0xAA

Go forward

Control the robot forward. The range of data is 10 ~ 25, indicates the size of the step that controls the robot's movement.

header1	header2	length	W/R	addr	data	check	tail1	tail2
0x55	0x00	0x09	0x01	0x12	XX	XX	0x00	0xAA

Go back

Control the robot go back. The range of data is 10 ~ 25, indicates the size of the step that controls the robot's movement.

header1	header2	length	W/R	addr	data	check	tail1	tail2
0x55	0x00	0x09	0x01	0x13	XX	XX	0x00	0xAA

Left translation

Control the robot to left translation. The range of data is 10 ~ 25, indicates the size of the step that controls the robot's movement.

header1	header2	length	W/R	addr	data	check	tail1	tail2
0x55	0x00	0x09	0x01	0x14	XX	XX	0x00	0xAA

Right translation

Control the robot to right translation. The range of data is 10 ~ 25, indicates the size of the step that controls the robot's movement.

header1	header2	length	W/R	addr	data	check	tail1	tail2
0x55	0x00	0x09	0x01	0x15	XX	XX	0x00	0xAA

Left rotation

Control the robot to rotate left. The range of data is 10 ~ 25, indicates the size of the step that controls the robot's movement.

header1	header2	length	W/R	addr	data	check	tail1	tail2
0x55	0x00	0x09	0x01	0x16	XX	XX	0x00	0xAA

Right rotation

Control the robot to rotate right. The range of data is 10~25, indicates the size of the step that controls the robot's movement.

header1	header2	length	W/R	addr	data	check	tail1	tail2
0x55	0x00	0x09	0x01	0x17	XX	XX	0x00	0xAA

Control the buzzer

Control the buzzer. The value ranges from 0 ~ 255, indicates the time for controlling the buzzer.

0 indicates that the buzzer is disabled, 255 indicates that the buzzer keeps sounding，Other values indicate that the buzzer automatically shuts off after sounding XX*100ms.

header1	header2	length	W/R	addr	data	check	tail1	tail2
0x55	0x00	0x09	0x01	0x18	XX	XX	0x00	0xAA

Height adjustment

Control robot body height. The range of data is: 1 ~ 3, indicates the height of the control robot, 1: low, 2: medium, 3: high.

header1	header2	length	W/R	addr	data	check	tail1	tail2
0x55	0x00	0x09	0x01	0x19	XX	XX	0x00	0xAA

Control speed

Control robot speed，The range of data is: 0 ~ 4，indicates the robot motion speed level.

0 indicates the highest speed, 4 indicates the slowest speed.

header1	header2	length	W/R	addr	data	check	tail1	tail2
0x55	0x00	0x09	0x01	0x23	XX	XX	0x00	0xAA

Look up and down

Control robot look up or down。The range of data is: 0 ~ 10，Control the height of the robot's head.

0 indicates the lowest height, 10 indicates the highest height

header1	header2	length	W/R	addr	data	check	tail1	tail2
0x55	0x00	0x09	0x01	0x24	XX	XX	0x00	0xAA

Two degrees of freedom tripod head

Control Two degrees of freedom tripod head of robot, the range of data1 and data2 is: 0 ~ 180 , indicates control servo S1 and servo S2 angle . If it is greater than 180°, the data is invalid.

header1	header2	length	W/R	addr	data1	data2	check	tail1	tail2
0x55	0x00	0x0A	0x01	0x25	XX	XX	XX	0x00	0xAA

Turn on the steering torque

Turn on the steering torque of robot. The torque is turned on by default when the steering engine is powered on.

header1	header2	length	W/R	addr	data	check	tail1	tail2
0x55	0x00	0x09	0x01	0x26	0x00	XX	0x00	0xAA

Turn off the steering torque

Turn off the steering torque of robot.

At this time, you can use the hand to move the steering gear, but you can't use the command to control the steering gear rotation, need to turn on the steering gear torque or re-power to control.

header1	header2	length	W/R	addr	data	check	tail1	tail2
0x55	0x00	0x09	0x01	0x27	0x00	XX	0x00	0xAA

Calibration joint deviation

Set the robot joint alignment deviation.

data1 represents the ID number to be calibrated.

The combination of data2 and data3 is deviation data. [deviation data = (data2 << 8)|data3]

header1	header2	length	W/R	addr	data1	data2	data3	check	tail1	tail2
0x55	0x00	0x0B	0x01	0x28	XX	XX	XX	XX	0x00	0xAA

Performance mode

Control robots to perform action groups. The range of data is: 0 ~ 8 , indicating different perform action groups.

action groups	0	1	2	3	4	5	6	7	8
perform	reset	stretch	greet	afraid	warm-up squats	spin in circles	wave	curl up	stride forward

command:

header1	header2	length	W/R	addr	data	check	tail1	tail2
0x55	0x00	0x09	0x01	0x3E	XX	XX	0x00	0xAA

Control a single steering gear angle

Control a single steering gear angle.

data1 is servo ID number, data2 is servo angle.

The combination of data3 and data4 is speed data. [speed data = (data3 << 8)|data4]

header1	header2	length	W/R	addr	data1	data2	data3	data4	check	tail1	tail2
0x55	0x00	0x0C	0x01	0x40	XX	XX	XX	XX	XX	0x00	0xAA

Control three steering gear angles on one leg

Control one leg servo angles of robot.

data1 is leg ID number, data2, data3, data4 indicates the angle of the leg from top to bottom steering gears.

The combination of data5 and data6 is speed data. [speed data = (data5 << 8)|data6]

header1	header2	length	W/R	addr	data1	data2	data3	data4	data5	data6	check	tail1	tail2
0x55	0x00	0x0E	0x01	0x41	XX	XX	XX	XX	XX	XX	XX	0x00	0xAA

Read instructions and data return instructions

Read the battery level

header1	header2	length	W/R	addr	data	check	tail1	tail2
0x55	0x00	0x09	0x02	0x01	0x01	0xF2	0x00	0xAA

Return battery level:

The data is the percentage of battery voltage (0-100), data*8.4V to get the battery voltage.

header1	header2	length	W/R	addr	data	check	tail1	tail2
0x55	0x00	0x09	0x12	0x01	XX	XX	0x00	0xAA

Read the firmware version

header1	header2	length	W/R	addr	data	check	tail1	tail2
0x55	0x00	0x09	0x02	0x07	0x01	0xEC	0x00	0xAA

Return the firmware version:

The data is the version number.

header1	header2	length	W/R	addr	data	check	tail1	tail2
0x55	0x00	0x09	0x12	0x07	XX	XX	0x00	0xAA

Read the robot servo angle

The data indicates the steering gear ID number to be read. (ID number is 1~18)

header1	header2	length	W/R	addr	data	check	tail1	tail2
0x55	0x00	0x09	0x02	0x50	XX	XX	0x00	0xAA

Return the robot servo angle:

The data indicates the steering gear angle which you read.

header1	header2	length	W/R	addr	data1~18	check	tail1	tail2
0x55	0x00	0x1A	0x12	0x07	XX	XX	0x00	0xAA

Read the IMU angle

header1	header2	length	W/R	addr	data	check	tail1	tail2
0x55	0x00	0x09	0x02	0x60	0x07	0x8D	0x00	0xAA

Return the IMU fusion calculated angle:

The combination of data1 and data2 is roll angle. [roll = (data1 << 8)|data2]

The combination of data3 and data4 is pitch angle. [pitch = (data3 << 8)|data4]

The combination of data5 and data6 is yaw angle. [yaw = (data5 << 8)|data6]

Data7 indicates the temperature.

header1	header2	length	W/R	addr	data1	data2	data3	data4	data5	data6	data7	check	tail1	tail2
0x55	0x00	0x0F	0x12	0x60	XX	XX	XX	XX	XX	XX	XX	XX	0x00	0xAA

Read raw IMU data

header1	header2	length	W/R	addr	data	check	tail1	tail2
0x55	0x00	0x09	0x02	0x61	0x12	0x81	0x00	0xAA

Returns IMU nine-axis raw data:

Data 1~6 indicates the accelerometer accel triaxial x y z data.

[accel_x = (data1 << 8) | data2] , [accel_y = (data3 << 8) | data4] , [accel_z = (data5 << 8) | data6]

Other data can be calculated in the above way

Data 7~12 indicates the triaxial x y z data of gyro,

Data 13~18 indicates the triaxial x y z data of the magnetometer.

header1	header2	length	W/R	addr	data1~6	data7~12	data13~18	check	tail1	tail2
0x55	0x00	0x1A	0x12	0x61	XX	XX	XX	XX	0x00	0xAA

Read the servo angle deviation

The data indicates the servo ID number to be read.

header1	header2	length	W/R	addr	data	check	tail1	tail2
0x55	0x00	0x09	0x02	0x70	XX	XX	0x00	0xAA

Return the servo angle deviation:

The data1 indicates the servo ID number.

The combination of data2 and data3 is deviation data. [deviation data = (data2 << 8)|data3]

header1	header2	length	W/R	addr	data1	data2	data3	check	tail1	tail2
0x55	0x00	0x0B	0x12	0x70	XX	XX	XX	XX	0x00	0xAA