Bus Servo Controller Communication Protocol

Serial communication, baud rate 9600

Command format:

Frame header	Data length	Command	Parameter
0x55 0x55	Length	Cmd	Prm 1…Prm N

- Frame header: receiving two consecutive 0×55 means the arrival of data pack.
- Data length: the number of parameters (N).
- The number of parameters N plus a command plus a byte length occupied by the data length itself, i.e, Length=N+2.
- Command: all kinds of command.
- Parameter: the control information required to be complemented apart from command.

1. Send Data to Controller by User

The transmitting data pin is connected to RX pin of controller board. If user sends the correct data to the control board, blue LED2 on board will blink once, indicating that the correct data has been received. If the wrong data is sent, blue LED2 will not respond and will remain on and the buzzer will make “DiDi” sound to indicate the wrong data sent.

1. Command **CMD_SERVO_MOVE** is to control servo rotation.

Frame header	Data length	Command	Parameter
0x55 0x55	The number of servos*3+5	3	Prm 1…Prm N

Parameter 1: the number of servo to be controlled

Parameter 2: the low 8 bits of time

Parameter 3: the high 8 bits of time

Parameter 4: the ID number of servo

Parameter 5: the low 8 bits of angle position

Parameter 6: the high 8 bits of angle position

Parameter.....: the format in accordance with parameter 4,5,6, which is used to control angle position of different servos.

For example,

① Control servo 1 to rotate to 800 in 1000ms

0x55 0x55	0x08	0x03	0x01 0xE8 0x03 0x01 0x20 0x03

② Control servo 2 and servo 9 to rotate to 800 in 800ms

0x55 0x55	0x0B	0x03	0x02 0x20 0x03 0x02 0x20 0x03 0x09 0x20 0x03

2. Command **CMD_ACTION_GROUP_RUN** is used to control the running of action group which has been downloaded into control board in advanced. Control the running times of action group. If want to keep action group running all the time, the parameter of running parameter should be 0 that refers to unlimited times.

Parameter 1: the serial number of action group to be performed.

Parameter 2: the low 8 bits of the action group to be performed.

Parameter 3: the high 8 bits of the action group to be performed.

For example,

① Control No.8 action group to perform once.

0x55 0x55	0x05	0x06	0x08 0x01 0x00

Control No.2 action group to keep running all the time.

0x55 0x55	0x05	0x06	0x02 0x00 0x00

3. Command **CMD_ACTION_GROUP_STOP** is used to stop the running action group.

Frame header	Data length	Command	Parameter
0x55 0x55	2	7	

For example,

Stop the running action group:

0x55 0x55	0x02	0x07

4. Command **CMD_ACTION_GROUP _SPEED** is used to control the speed of action group, which is presented in the form of percentage. For example, change No.1 action group to the

For example, control the speed of action group No. 1 to double the original

speed, then the percentage value is 200, representing 200%. (if the serial number of action group is 0xFF, it refers to adjust all the downloaded action group.)

Note:

1) the speed parameter adjusted is not saved after shutdown. It always remains the default parameter when start running action group next time.

2) Servo has maximum speed so it is meaningless if the speed exceeds the maximum speed.

Frame header	Data length	Command	Parameter
0x55 0x55	5	11	Prm 1 Prm 2 Prm 3

Parameter 1: the serial number of servo to be adjusted

Parameter 2: the low 8 bits of the percentage of speed

Parameter 3: the high 8 bits of the percentage of speed

For example,

① Control No.8 action group to run at speed of 50%

0x55 0x55	0x05	0x0B	0x08 0x32 0x00

② Several action groups have been downloaded to servo control board. Adjust all action groups to the three times original speed, e.i., 300%

0x55 0x55	0x05	0x0B	0xFF 0x2C 0x01

5. Command **CMD_GET_BATTERY_VOLTAGE** is used to control the voltage of control board. The unit of voltage us mV. Control board returns data at once

after sending this command, and the returned data is a data package with two parameters.

Frame header	Data length	Command	Parameter
0x55 0x55	2	15	

The data package is returned by control board:

Frame header	Data length	Command	Parameter
0x55 0x55	4	15	Prm 1 Prm 2

Parameter 1: the low 8 bits of voltage

Parameter 2: the high 8 bits of voltage

For example,

Obtain the voltage of control board:

0x55 0x55	0x02	0x0F

For example, the returned voltage is 7500mV:

0x55 0x55	0x04	0x0F	0x4C 0x1D

6. Command **CMD_MULT_SERVO_UNLOAD** is used to control the force of motor. After this command is sent, the corresponding servo can be rotated at will.

Frame header	Data length	Command	Parameter
0x55 0x55	The numbers of servos+3	20	Prm 1…Prm N

Parameter 1: the number of the controlled servos

Parameter 2: the ID of servo a

Parameter 3: the ID of servo b

Parameter .....: the ID of servo x

For example,

① Control servo 1,2 and 3 to unload force.

0x55 0x55	0x06	0x14	0x03 0x01 0x02 0x03

② Control servo 1,2,3,4 and 5 to unload force.

0x55 0x55	0x09	0x14	0x06 0x01 0x02 0x03 0x04 0x05 0x06

7. Command **CMD_MULT_SERVO_POS_READ** is used to read servo angle position.

Frame header	Data length	Command	Parameter
0x55 0x55	The numbers of servos+3	21	Prm 1…Prm N

Parameter 1: the number of servos to be read.

Parameter 2: the high 8 bits of angle.

Parameter 3: the low 8 bits of angle.

Parameter .....: the format is in accordance with parameter above to read the angle for servos with different ID.

For example,

Read the angle of servo 1,2,3,4,5 and 6:

0x55 0x55	0x09	0x15	0x06 0x01 0x02 0x03 0x04 0x05 0x06

If all the returned angle values are 500:

0x55 0x55	0x15	0x15	0x06 0x01 0xF4 0x01 0x02 0xF4 0x01 0x03 0xF4 0x01 0x04 0xF4 0x01 0x05 0xF4 0x01 0x06 0xF4 0x01

2. Control Send Date to User

In the process of using control board, the data of status change (for example, the end of an action group) will send to user through serial port. There is more than one way to operate the control board. For example, wireless handle, Bluetooth module and serial port for secondary development. Therefore, it is necessary to let the different control methods know the current status of the control board, so that they can manage and operate it. The following are the commands returned to the user by the control board.

1. Command **CMD _ACTION_GROUP_RUN:** When user send the data package for controlling the running of action group, control board return data pack once action group starts running. The format of data is in accordance with the data sent by user.

Frame header	Data length	Command	Parameter
0x55 0x55	5	6	Prm 1 Prm 2 Prm 3

Parameter 1: the serial number of action group to be performed

Parameter 2: the low 8 bits of the running times of action group

Parameter 3: the high 8 bits of the running times of action group

For example,

When No.8 action group run once, the data returned by control board to user is:

0x55 0x55	0x05	0x06	0x08 0x01 0x00