

# LeArm PC & APP Communication Protocol

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## LeArm Upper Computer & APP Communication Protocol

### Protocol Frame Format

Header1	Header2	Length	Command	Data Parameters
0x55	0x55	Length	CMD	Parameter 1~N

### Commands

#### Firmware Query

Data Length: 2

Command: 1

Data Parameters: None

Response:

Header1	Header2	Length	Command	Parameter1	Parameter 2
0x55	0x55	3	1	Servo type (1–PWM, 2– Bus servo)	Firmware version

## Read Servo Offsets

Description: Read the offset values of all servos.

Data Length: 14

Command: 2

Data Parameters: None

Response:

Header1	Header2	Length	Command	Parameter1	Param2	...
0x55	0x55	14	2	Servo ID	Offset value	The following parameters correspond sequentially to parameters 1 and 2.

## Control Single/Multiple Servo Pulse Width

Data Length: (Number of Servos \* 3) + 5

Command: 3

Data Parameters

Parameter
Param 1: Number of servos to control

Param 2: Low byte of servo run time
Param 3: High byte of servo run time
Param 4: Servo ID
Param 5: Low byte of pulse width
Param 6: High byte of pulse width
Subsequent data parameters correspond sequentially to parameters 4, 5, and 6, controlling servos with different IDs.

**Response: None**

## Coordinate Control

**Data Length: 5**

**Command: 4**

**Data Parameters:**

Data Parameters:
Parameter 1: Increment of the robot's coordinate along the X-axis
Parameter 2: Increment of the robot's coordinate along the Y-axis
Parameter 3: Increment of the robot's coordinate along the Z-axis

**Response: None**

## Action Group Run

**Data Length: 5**

**Command: 6**

**Data Parameters:**

Parameter
Parameter 1: Action group ID to be executed
Parameter 2: Lower 8 bits of the number of times the action group should be executed
Parameter 3: Higher 8 bits of the number of times the action group should be executed

**Response: None**

## **Stop Running Action Group**

**Data Length: 2**

**Command: 7**

**Data Parameters: None**

**Response: None**

## **Erase Downloaded Action Groups**

**Data Length: 2**

**Command: 8**

**Data Parameters: None**

**Response:**

Header1	Header2	Length	Command
0x55	0x55	2	8

## Chassis Control

**Data Length: 5**

**Command: 9**

**Data Parameters:**

Parameter	Description
Parameter 1: Controls forward, backward, left strafe, and right strafe. Values:0 – Stop, 1 – Left strafe, 2 – Forward-left diagonal, 3 – Forward, 4 – Forward-right diagonal, 5 – Right strafe	

6 – Backward-right diagonal, 7 – Backward, 8 – Backward-left diagonal |

|Parameter 2: Controls in-place rotation | Values:0 – Stop, 1 – Rotate left in place, 2 – Rotate right in place |

**Response: None**

## Set Servo Offset

**Data Length: 4**

**Command: 10**

**Data Parameters:**

Parameter
Param 1: Servo ID
Param 2: Offset value

**Response: None**

## Download Servo Offsets

**Data Length: 14**

**Command: 11**

**Data Parameters:**

Parameter
Param1: Servo ID
Param2: Servo pulse width offset
The subsequent data parameters correspond respectively to parameters 1 and 2 for different servo IDs, used to download the pulse width offsets for each servo.

**Response:**

Header1	Header2	Length	Command
0x55	0x55	2	11

## Initialize Servo Pose

**Data Length: 2**

Command: 12

Data Parameters: None

Response: None

## Read Servo Angles

Data Length: 2

Command: 13

Data Parameters: None

Response:

Header1	Header2	Length	CMD	Parameter 1	Parameter 2	Parameter 3	...
0x55	0x55	20	13	Servo ID	Pulse width LSB	Pulse width MSB	The subsequent parameters follow the same format as parameters 1, 2, and 3.

## Action Group Download

**Description:** Download action groups frame by frame to the control board until complete

**Data Length:** (Number of servos \* 3) + 8

**Command:** 25

**Data Parameters:**

Parameter
Parameter 1: Action group number to download
Parameter 2: Total number of frames in this action group
Parameter 3: Frame number of the action
Parameter 4: Total number of servos to be downloaded
Parameter 5: Control time, low 8 bits
Parameter 6: Control time, high 8 bits
Parameter 7: Servo ID number
Parameter 8: Servo pulse width value, low 8 bits
Parameter 9: Servo pulse width value, high 8 bits
The subsequent parameters follow the same format as parameters 7, 8, and 9 for each additional servo.

**Response:**

Header1	Header2	Length	CMD
0x55	0x55	2	25