

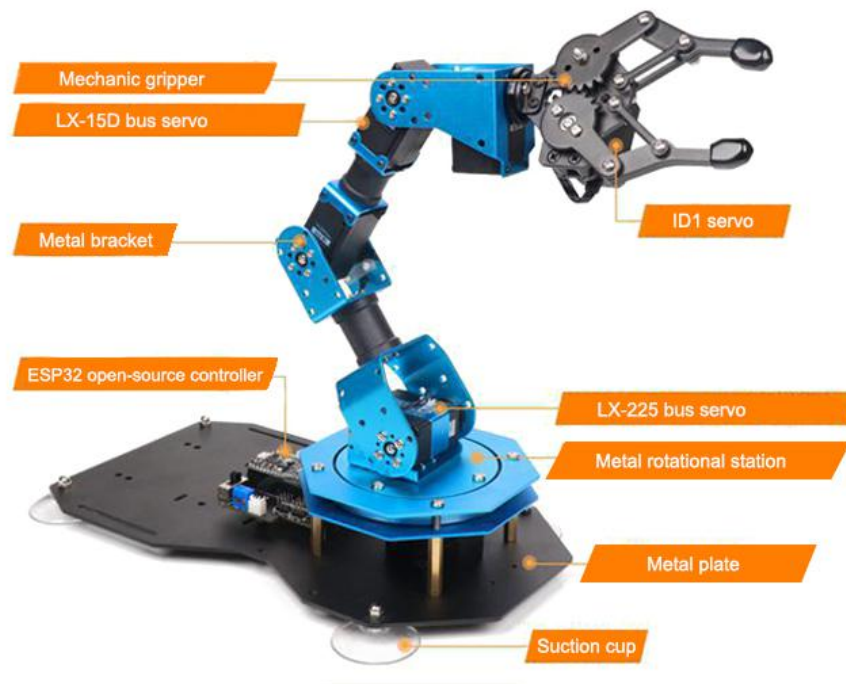
Lesson 1 xArm ESP32 Robotic Arm Introduction

1. Product Introduction

Powered by ESP32 open-source microcontroller, xArm ESP32 robotic arm with Wi-Fi and Bluetooth wireless communication functions uses Micro-Python for programming. It not only has various operation functions of traditional desktop robotic arm, but also has the expansion interface. It is easy and efficient to explore more secondary development projects with sensor kit and Python editor software developed by our company.

Provide Python library files for various basic operations of the ESP32 microcontroller, library files for various sensors and comprehensive application case programs to implement such as intelligent grasping, color sorting, and inverse kinematic operations.

xArm ESP opens-source robotic arm has three ways to program actions, such as PC software and mobile app. Six control methods such as pc software, mobile app, PS2 handle and synchronization controller are supported. The robotic arms can also be controlled wirelessly via Bluetooth.



2. Overview

Note: Since Python is a stripped-down version of Python, you need to master the basic syntax of Python. We provide some learning tutorial regarding Python in Appendix for quick learning.

Step 1: Learn about xArm ESP32 robotic arm

There are six lessons in the folder “1. Getting Ready”. This chapter must be learnt first. User with the unassembled robotic arm need to learn all the lessons in this chapter one by one while user with the assembled one just need to learn “Lesson 1 xArm ESP32 robotic arm introduction” and “Lesson 3 Start xArm ESP32”

Step 2: Control xArm ESP32 robotic arm

Please go to the folder “2. Remote Control” to learn PS2 handle control, mobile app control and mouse control to help you get quick experience.

Step 3: PC software and action program learning

In “3. xArm ESP32 Pc Software and Action Programming”, you will learn Pc software and action programming systematically. Master the operations of Pc software, the programming of a simple action, call the programmed action via App and how to integrate actions and offline running.

Step 4: Advanced Learning

This section “4. Advanced Lesson” is optional, which is only for your reference.

1. Advanced Lesson- Python Editor Learning (including two sections)

“Lesson 1 Python editor Function Introduction” mainly explain the function and usage of Python editor. “Lesson 2 Underlying File Brief Introduction” mainly gives a brief description of the functions of underlying programs.

2. Advanced Lesson- ESP32 Basic Lesson (including eight sections)

This chapter will provide some basic examples of ESP32, including LED, button, external interrupt, time, etc. User can have a preliminary understanding of ESP32 through learning this chapter.

3. Advanced Lesson- The Application of Sensor Extension Kit (including seven sections)

Note: This chapter is application to the users who have purchased the sensor extension kit.

Through learning this chapter, you can learn the installation and wiring of sensors, how to start and download the game programmings, the game implementation and functions performance of the corresponding sensors.

4. Advanced Lesson-Mobile App Programming Method (including one section)

You can learn how to program, save and execute action for the robotic arm via app through this chapter.

5. Advanced Lesson-Bus Servo Communication Protocol (including one section)

You can understand the communication protocol and the control method between the robotic arm controller and servo, which deepens the understanding of the robotic arm and provides help for secondary development.

6. Advanced Lesson-Bus Servo Setting (including two sections)

This chapter mainly introduce you how to debug servo, learn ID setting for bus servo and the setting method of the initial position, which is used for future debugging.

7. Advanced Lesson-Forward and Inverse Kinematics (including three sections)

This chapter is mainly to help user learn the trajectory planning and control part of the xArm ESP32 robotic arm. We also provide some formula algorithms of inverse kinematics, and mark the source code path of related programs. The code comments can be viewed if you are interested in.

8. Advanced Lesson- Synchronization Controller Operation Guidance (including three sections)

This chapter is applicable to users who have purchased the synchronization controller.

It mainly introduce the operations and action programming of the robotic arm by the synchronization controller.

3. Packing List











Package List (Unassembled)

Robotic arm brackets (with servo horns)	1set	xArm ESP32 controller	1pcs
7.5V 6A DC power adapter	1pcs	LX-15D bus servo	4pcs
PS2 handle	1pcs	No.1 bus servo	1pcs
Handle receiver	1pcs	LX-225 intelligent serial bus servo	1pcs
USB cable	1pcs	Screwdriver	1pcs

Package List(Assembled)

xArm ESP32 body	1pcs	7.5V 6A DC power adapter	1pcs
PS2 handle	1pcs	Handle control	1pcs
USB cable	1pcs	Screwdriver	1pcs

Sensor Development Kit Package List

 Ultrasonic glowing module 1pcs	 Infrared obstacle avoidance sensor 1pcs	 Color sensor 1pcs	 Touch sensor 1pcs	 4PIN wire 4pcs
 Joystick module 1pcs	 OLED display 1pc	 Knob module 1pcs	 Colored block (red, green, blue) 3pcs	 Accessory kit 1set