🔌 Arduino Uno + ESP32 Wiring Guide

📦 Components:

- Arduino Uno
- ESP32
- Joystick Module
- Touch Sensor
- Servo Motor
- LCD Display (16x2, I2C)
- Jumper Wires
- (Optional) External 5V power supply for servo

🛠️ Arduino Uno Connections

🎮 Joystick Module:

Joystick Pin	Arduino Uno Pin
VRX (X-axis)	A0
VRY (Y-axis)	A1
VCC	5V
GND	GND

✋ Touch Sensor:

Touch Sensor Pin	Arduino Uno Pin
Signal	D2
VCC	5V
GND	GND

🔄 Servo Motor:

Servo Pin	Arduino Uno Pin
Signal	D9
VCC	5V *(or external)*
GND	GND *(common GND with Arduino)*

📟 LCD Display (16x2 I2C):

LCD Pin Arduino Uno Pin

SDA A4

SCL A5

VCC 5V

GND GND

🔁 **Serial Communication with ESP32:**

Arduino Uno Pin ESP32 Pin

TX (D1) D4 (RX)

RX (D0) D5 (TX)

GND GND

⚙️ **ESP32 Connections**

🔁 **Serial Communication with Arduino Uno:**

ESP32 Pin Arduino Uno Pin

D4 (RX) TX (D1)

D5 (TX) RX (D0)

GND GND

🔌 **Power:**

- Connect ESP32 to your computer via **USB**
- Or use external power:
    - **VIN** → 5V
    - **GND** → GND

▶️ **How to Run**

✅ **Step 1: Prepare and Upload Arduino Uno Code**

1. **Open the Arduino IDE**
    - Launch the Arduino IDE on your computer.
2. **Create a New Sketch**
    - Go to **File > New** to open a new sketch.

3. **Paste the Arduino Uno Code**
    - Copy and paste your Arduino Uno code into the new sketch.
4. **Save the File**
    - Go to **File > Save As**, name it:
      Arduino_Uno_Lock_System_With_LCD.ino
5. **Connect the Arduino Uno**
    - Temporarily **disconnect** the serial communication wires to ESP32:
        - TX (D1) → ESP32 D4 (RX)
        - RX (D0) → ESP32 D5 (TX)
    - Leave **other component connections** (joystick, touch sensor, servo, LCD) **as is**.
    - Connect the Arduino Uno to your computer via USB.
6. **Select Board and Port**
    - Go to **Tools > Board > Arduino AVR Boards > Arduino Uno**
    - Go to **Tools > Port**, select your port (e.g., **COM3** on Windows or /dev/ttyUSB0 on Linux/macOS).
7. **Compile the Code**
    - Click the ✓ **Verify** button (top-left corner).
    - Wait for Done compiling.
    - If errors appear (e.g., missing LiquidCrystal_I2C), make sure all required libraries are installed.
8. **Upload the Code**
    - Click the → **Upload** button.
    - Wait for Done uploading.

✅ Keep the Arduino Uno connected to USB to supply power and view Serial output if needed.

✅ **Step 2: Prepare and Upload ESP32 Code**

1. **Open a New Sketch in Arduino IDE**
    - Go to **File > New** or open a **new instance** of Arduino IDE.
2. **Paste the ESP32 Code**
    - Copy and paste your updated ESP32 code (e.g., single-pattern-at-startup version).
3. **Save the File**

- Go to **File > Save As**, name it: ESP32_SMS_Pattern_Generator_With_D4_D5_Fixed_Single_Pattern.ino

4. **Connect the ESP32**
   - Disconnect any serial wires connected to Arduino:
     - ESP32 D4 (RX) from Arduino TX
     - ESP32 D5 (TX) from Arduino RX
   - Plug the **ESP32** into your computer via USB.
5. **Select Board and Port**
   - Go to **Tools > Board > ESP32 Arduino > ESP32 Dev Module**
   - Go to **Tools > Port**, select the correct port (e.g., **COM4**)
6. **Compile the Code**
   - Click the ✓ **Verify** button.
   - Wait for Done compiling.
   - If errors occur, ensure the **ESP32 board package** is properly installed.
7. **Upload the Code**
   - Click the → **Upload** button.
   - When Connecting.... appears:
     - Press and hold the **BOOT** button.
     - Press and release the **EN** button.
     - Then release **BOOT**.
   - Wait for Done uploading.

✅ Keep the ESP32 connected to USB for power and serial communication.