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CUSTOMIZABLE CONTROLLER

WORKSHOP

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CONTENT

Electrical & Electronics (EE)

Components
Schematics
Prototyping

Programming

Initializations & Libraries
Transmitting & Receiving
Data reception

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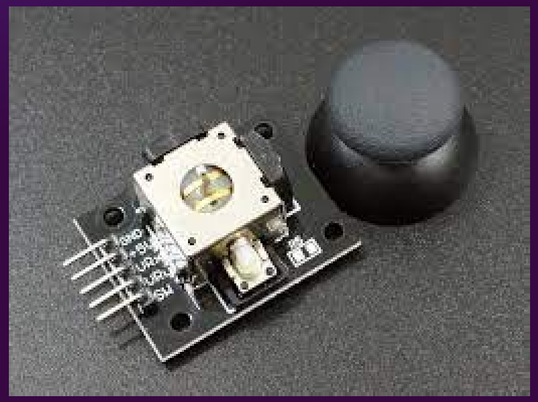
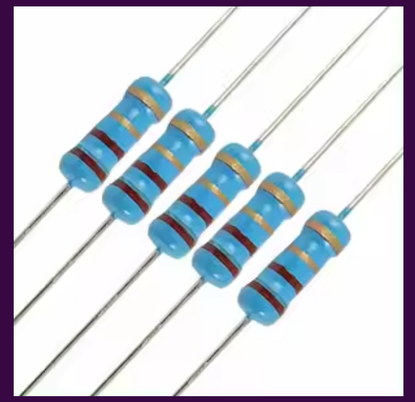
EE Components



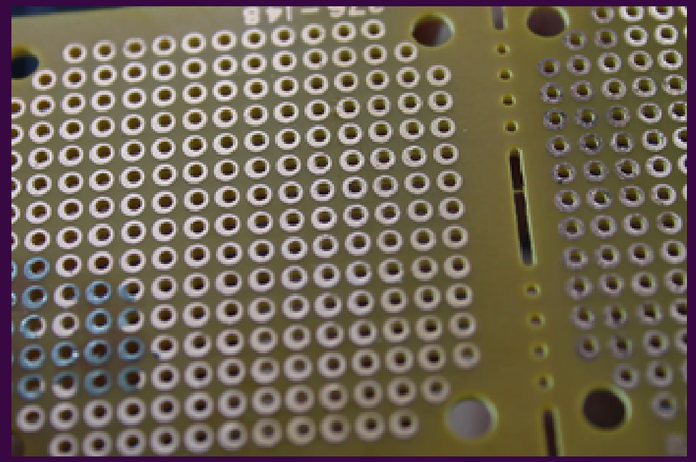
Joystick

Tactile buttons



Resistors 4.7k

Microcontroller



Perfboard/donut board

Soldering supplies

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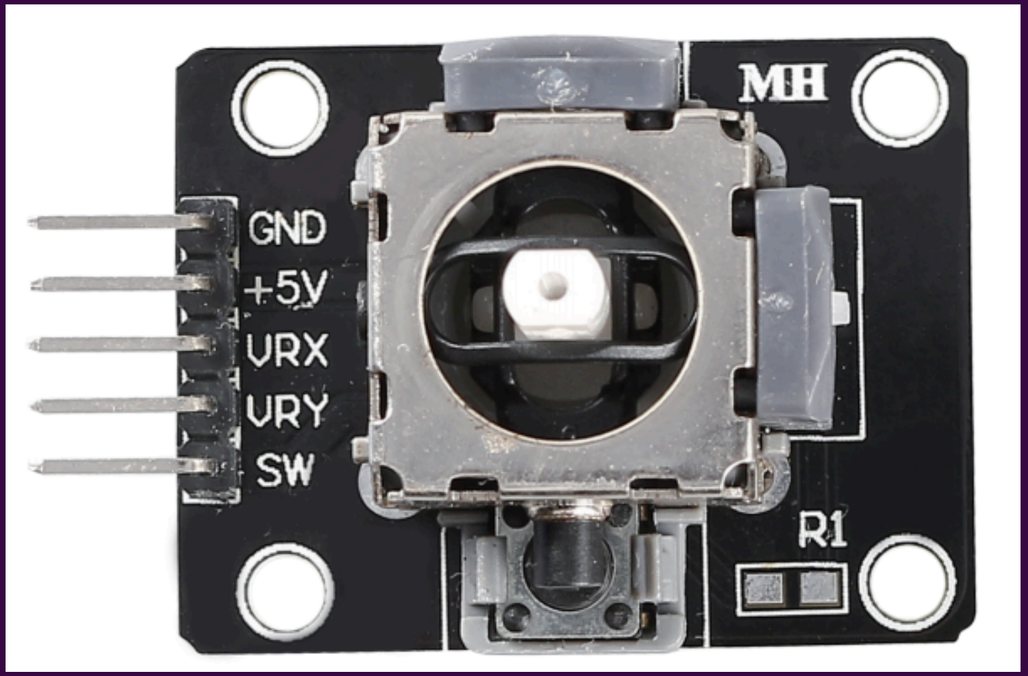
Schematic Connections

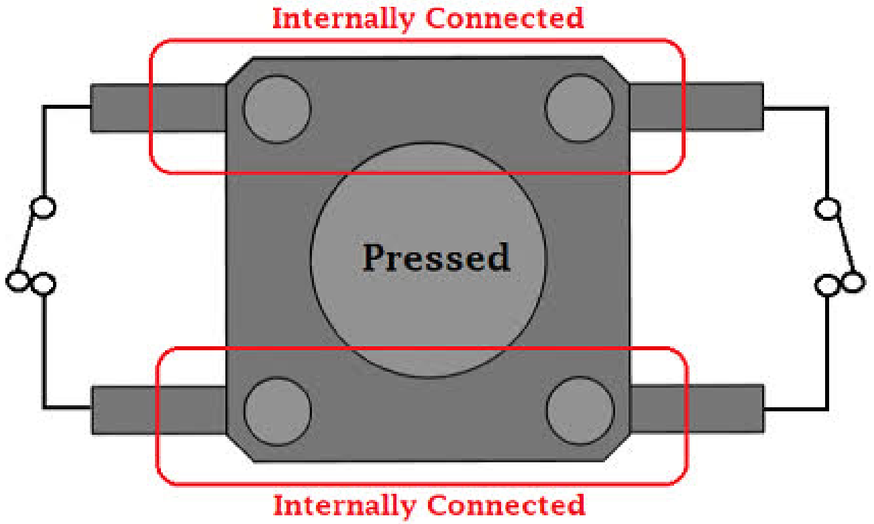
MUST refer which pins can receive input & which can give output

Joystick	Analog input pin
Button	Analog input pin




esp32io.com

esp32io.com


Internally Connected
Pressed
Internally Connected

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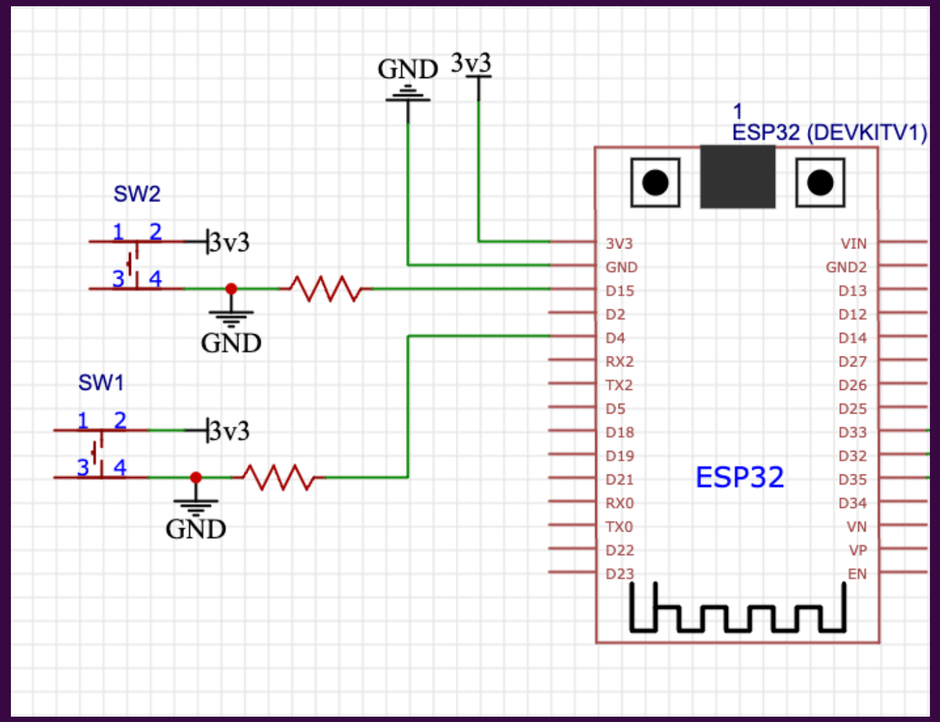
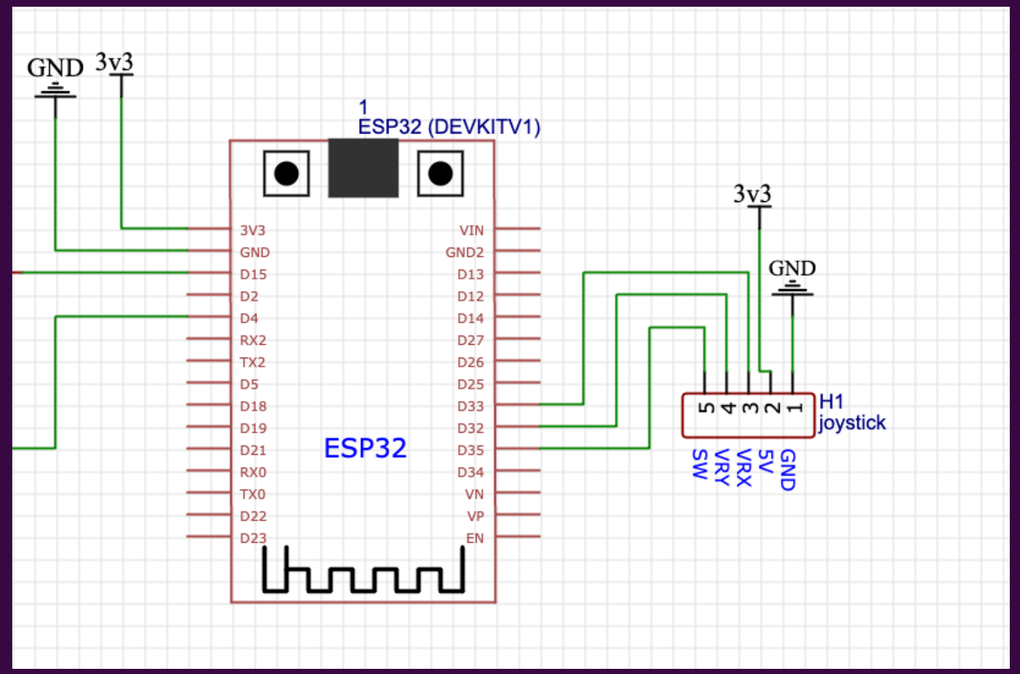
Schematic Connections

Switch schematic



Joystick schematic



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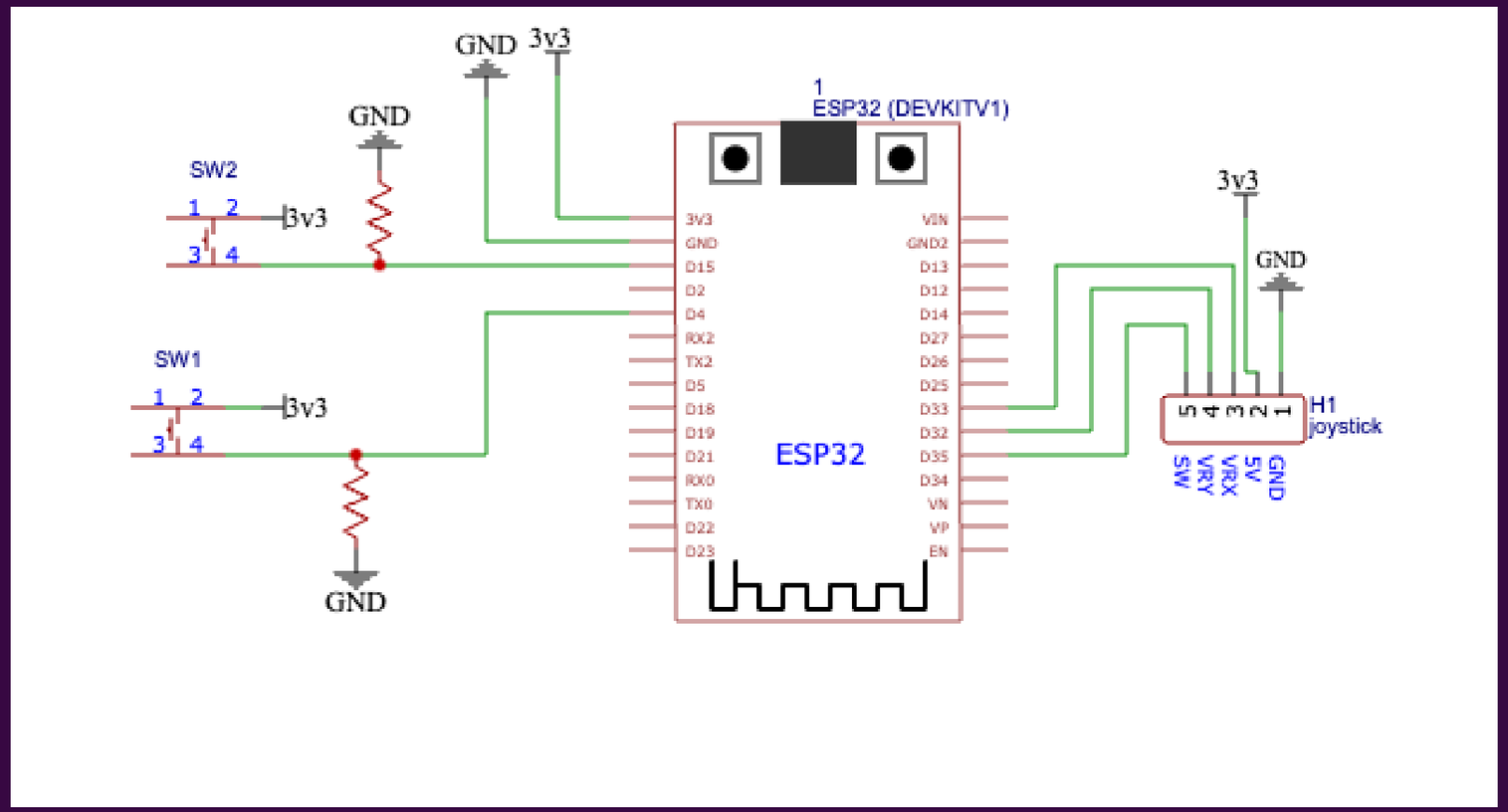
Prototyping

FINAL SCHEMATIC



SOLDERING TIME!

(after breadboard)

PROGRAMMING

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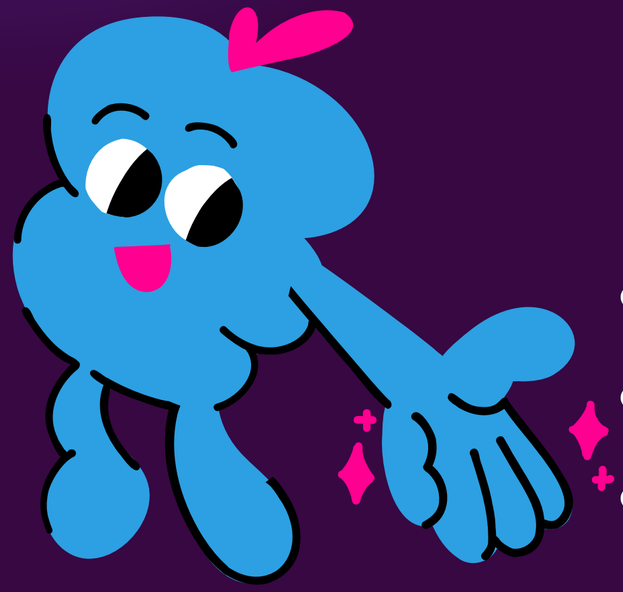


WHAT DO YOU NEED?

- 2 ESP32(RECEIVER & TRANSMITTER)
- ARDUINO IDE
- ESP32 MAC ADDRESS
- 2 SKETCH

SETUP YOUR IDE

setp 1 : setup esp32 borad

arduinio -> File -> preference -> paste the link

setp 2 : install ESP32 board library

arduinio -> board manager

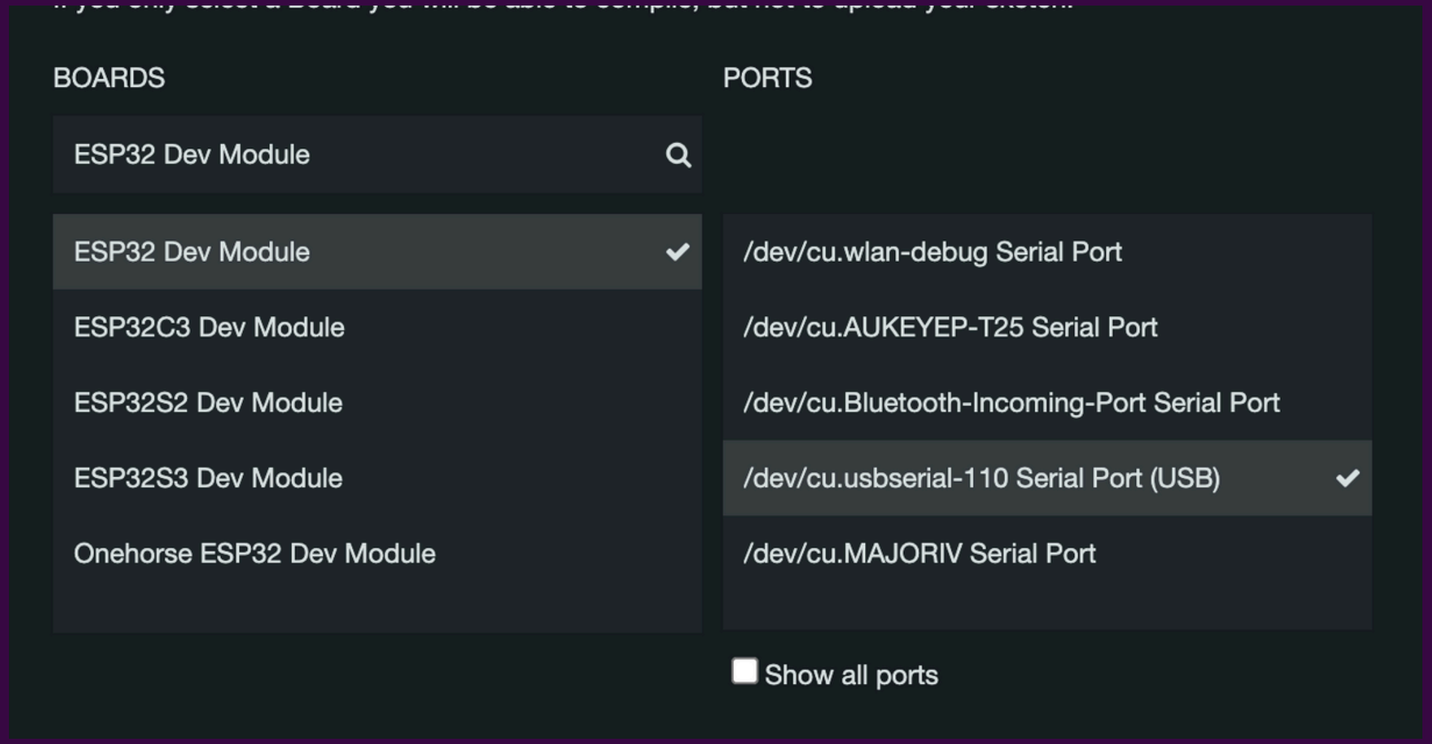
- seacrh 'esp32' by espressif system

setp 3 : download "ezButton" library at library manager

```
#include "WiFi.h"
#include "esp_now.h"
#include <ezButton.h>

```

setp 4: select the right port and “ESP32 Dev Module” board



CUSTOMIZABLE CONTROLLER

PROGRAMMING

Initializations & libraries

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LIBRARIES

```
#include "WiFi.h"
#include "esp_now.h"
#include <ezButton.h>
```

Controller sketch (TRANSMIT)

PIN DEFINITIONS

```
#define VRX ?
#define VRY ?
#define SW  ?
#define redB ?
#define whiteB ?
```

```
ezButton button(SW);
```

RECEIVER ADDRESS (HAVE TO CHECK)

```
uint8_t ReceiverAddress[] = {0x08, 0xD1, 0xF9, 0x3B, 0x0B, 0xA8};
```

STEP 2
(TRANSMIT)

PROGRAMMING

Setup & Algorithm

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1. get the receiver ESP's mac address

esp_macAddress.ino

```
1   #include "WiFi.h"
2   void setup() {
3     Serial.begin(115200);
4     WiFi.mode(WIFI_MODE_STA);
5     Serial.println(WiFi.macAddress());
6   }
7
8   void loop() {
9
10  }
11
```

CUSTOMIZABLE CONTROLLER

STEP 3
(TRANSMIT)

PROGRAMMING
Setup & Algorithm

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3. create a new sketch , to transmit data from controller to the esp32

```
#include "WiFi.h"
#include "esp_now.h"
#include <ezButton.h>

#define VRX 35
#define VRY 32
#define SW 17
#define redB 2
#define whiteB 15
ezButton button(SW);

int stateRed;
int stateWhite;
int stateSwitch;
int valueVRX=0;
int valueVRY=0;

//address of the receiver esp32
uint8_t ReceiverAddress[] = {0x08, 0xD1, 0xF9, 0x3B, 0x0B, 0xA8};

//here all the variable that will be send to esp
typedef struct struct_message {
  int redValue;
  int whiteValue;
  int valueX;
  int valueY;
  int swValue;
}struct_message;
struct_message senderData;

esp_now_peer_info_t peerInfo;

// function that will indicate the message was sent to the receiver esp
void OnDataSent(const uint8_t *mac_addr, esp_now_send_status_t status){
  Serial.print("\r\nLast Packaet Send Status: \t");
  Serial.println(status == ESP_NOW_SEND_SUCCESS ? " DELIVERY SUCCESS" : "Delivery Fail");
 //delay(1000);
}
```

```
40  void setup() {
41    Serial.begin(115200);
42    pinMode(redB, INPUT);
43    pinMode(whiteB, INPUT);
44    pinMode(VRX, INPUT);
45    pinMode(VRY, INPUT);
```

void setup:

- SETUP THE PIN (INPUT)
- INITIALIZE THE ESP COMMUNICATION
- CALL THE SENT DATA FUNCTION
- REGISTER PEER ADDRESS
- CHECK IF FAIL TO PEER

```
48  WiFi.mode(WIFI_STA);
49
50  if(esp_now_init() != ESP_OK){
51    Serial.println("Error initializing ESP_NOW");
52    return;
53  }
54  esp_now_register_send_cb(OnDataSent);
55
56    // Register peer
57    memcpy(peerInfo.peer_addr, ReceiverAddress, 6);
58    peerInfo.channel = 0;
59    peerInfo.encrypt = false;
60
61
62    if (esp_now_add_peer(&peerInfo) != ESP_OK) {
63      Serial.println("Failed to add peer");
64      return;
65    }
```

```
72    stateSwitch = button.getState();
73    senderData.swValue = stateSwitch;
74  //stateRed is the value from the button, wi
75    stateRed = digitalRead(redB);
76    senderData.redValue = stateRed;
77
78    stateWhite = digitalRead(whiteB);
79    senderData.whiteValue = stateWhite;
80
81    valueVRX = analogRead(VRX);
82    senderData.valueX = valueVRX;
83    valueVRY = analogRead(VRY);
84    senderData.valueY = valueVRY;
```

void loop:

- SENDING THE INPUT DATA TO THE RECEIVER ESP BY USING STRUCT “SENDERDATA”
- THE DATA PASS DOWN TO THE RESULT FUNCTION TO BE SENT TO THE RECEIVER ESP32.
- CHECK IF THE TRANSMITING IS SUCCESS

```
93  //this function is the one sending data to the receiver esp.
94   esp_err_t result = esp_now_send(ReceiverAddress, (uint8_t *) &senderData, sizeof(senderData));
95
96   if(result == ESP_OK){
97     Serial.println("Sent with Success");
98    //delay(1000);
99   }
100  else {
101    Serial.println("Error sending data");
102    //delay(1000);
103  }
```

PROGRAMMING

Initializations & libraries

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LIBRARIES

```
#include "WiFi.h"
#include "esp_now.h"
#include <ESP32Servo.h>
```

Receiver sketch

PIN DEFINITIONS

```
#define m1 27
#define m2 26
#define m3 14
#define m4 12
#define enA 13
#define enB 25
#define servo 4
```

RECEIVER ADDRESS : {0X08, 0XD1, 0XF9, 0X3B, 0X0B, 0XA8};

```
Servo myservo;
//make sure all the variable here same with sender code
typedef struct struct_message {
  int redValue;
  int whiteValue;
  int valueX;
  int valueY;
  int swValue;
}struct_message;

//reading data message
struct_message readingData;

int vrx = 0;
int vry = 0;
int turn_left;
int turn_right;
int val;
int c = 0;
```

- REWRITE THE STRUCT VARIABLE FROM THE TRANSIMITTER CODE
- ADD ON VARIABLE TO READ THE TRAMISTTING DATA
- USE READINGDATA TO GET DATA FROM CONTROLLER

```
//function that receive incomming data from the sender esp.
void OnDataRecv(const uint8_t * mac, const uint8_t *incomingData, int len){
  memcpy(&readingData, incomingData, sizeof(readingData));

  vry = readingData.valueY;
  vrx = readingData.valueX;
  turn_left = readingData.whiteValue;
  turn_right = readingData.redValue;
  val = readingData.swValue;
```

```
05  void setup() {
06    //setup all the mode here
07    Serial.begin(115200);
08    pinMode(m1, OUTPUT);
09    pinMode(m2, OUTPUT);
10    pinMode(m3, OUTPUT);
11    pinMode(m4, OUTPUT);
12    pinMode(enA, OUTPUT);
13    pinMode(enB, OUTPUT);
14    myservo.attach(servo);
15
16    myservo.write(0);
17    WiFi.mode(WIFI_STA);
18    if (esp_now_init() != ESP_OK) {
19      Serial.println("Error initializing ESP-NOW");
20      return;
21    }
22    esp_now_register_recv_cb(OnDataRecv);
23  }
```

void setup:

- SETUP THE PIN (OUTPUT)
- CALL THE RECEIVE DATA FUNCTION TO READ THE DATA

```
25  void loop() {
26    // the main loop will be empty since all the receive data loopiing at the sender esp
27  }
```

- LET THE VOID LOOP EMPTY

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THE END

visit this github to view full project

Thank You