

## DESCRIPTION DOCUMENT FOR WIFI TWO INPUT TWO OUTPUT BOARD

### **HARDWARE REVISION 0.2**

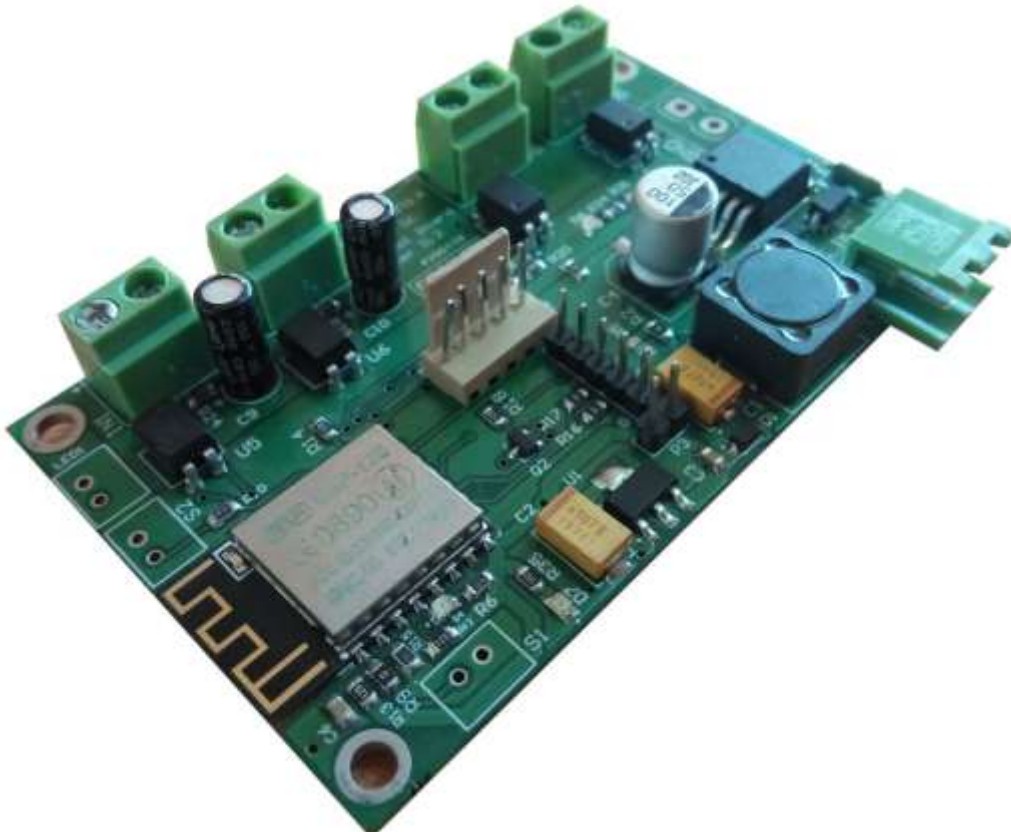
Department	Name	Signature	Date
Author			
Reviewer			
Approver			

#### Revision History

Rev	Description of Change	Effective Date
A	Initial Release	
B		

#### ABSTRACT:

This document is a detailed product description that describes the effective features of the product. It includes a functional hardware description of the product with its internal block diagram and product images.



**Table of Contents**

Revision History ..... 1

1. ABBREVIATIONS ..... 3

2. REFERENCES ..... 3

3. PURPOSE ..... 3

4. SCOPE ..... 3

5. SAFETY AND WARNING ..... 3

6. PRODUCT FEATURES ..... 3

7. PRODUCT DESCRIPTION ..... 4

    a. PHYSICAL DESCRIPTION..... 4

    b. FUNCTIONAL DESCRIPTION ..... 4

8. SYSTEM OVERVIEW ..... 4

9. TECHNICAL SPECIFICATION ..... 5

    a. ELECTRICAL SPECIFICATION ..... 5

    b. MECHANICAL SPECIFICATION ..... 5

10. COMMANDS FOR IOs ..... 6

    a. MQTT COMMANDS TO READ INPUT ..... 6

    b. MQTT COMMANDS TO CONTROL OUTPUTS..... 6

11. ELECTRICAL CONNECTIONS..... 7

    a. HEADER PIN CONFIGURATION ..... 9

        i. HEADER IN1..... 9

        ii. HEADER IN2..... 9

        iii. HEADER OUT1 ..... 9

        iv. HEADER OUT2 ..... 10

        v. HEADER VDC\_IN ..... 10

    b. APPLICATION WIRING DIAGRAM ..... 10

12. HOW TO USE THE PRODUCT ..... 11

IMPORTANT NOTICE ..... 13

**Table of figures**

Figure 1: Block Diagram ..... 4

Figure 2: Board Dimensions ..... 5

Figure 3: Header Details..... 7

Figure 4: Header Pin Number References..... 8

Figure 5: Header Pin Name References ..... 8

Figure 6: Programming Header Details ..... 9

Figure 7: UART-USB Connection Details ..... 9

Figure 8: Application Wiring Example ..... 10

Figure 9: Device Hosting Access Point ..... 11

Figure 10: Enter Default IP Address ..... 11

Figure 11: Device Web Page Accessed..... 12

Figure 12: Enter SSID and Password and Other Details ..... 12

## 1. ABBREVIATIONS

Term	Description
HTTP	Hypertext Transfer Protocol
MQTT	Message Queue Telemetry Transport
DC	Direct current
GPIO	General Purpose Input Output

## 2. REFERENCES

Company Website link	<a href="https://www.armtronix.in">https://www.armtronix.in</a>
Youtube link	<a href="https://www.youtube.com/channel/UCr3QNs65jDSxKDX4QPc03oQ">https://www.youtube.com/channel/UCr3QNs65jDSxKDX4QPc03oQ</a>
Intractable's Weblink	<a href="https://www.instructables.com/member/Armtronix/">https://www.instructables.com/member/Armtronix/</a>
Github's Weblink	<a href="https://github.com/armtronix">https://github.com/armtronix</a>

## 3. PURPOSE

The purpose of this document is to outline the design description for the Wifi Two DIO Board. It provides a high-level summary of the product.

## 4. SCOPE

This document describes system architecture which includes Power supply, relay, WiFi Module and UART to USB converter.

## 5. SAFETY AND WARNING

**If you are working with DC power, please take necessary precautions. Do not short the positive and negative terminals of the power supply, as it may damage the Hardware and may create hazardous to your health. Do not bring AC power in contact with this board, which will damage the hardware and may create hazardous to your health. Please consider disconnecting power supply from the board if you would like to make any changes in connections. Working without safety towards hardware is not advisable.**

**Fire Hazard: Making wrong connections, drawing more than rated power, contact with water or other conducting material, and other types of misuse/overuse/malfunction can all cause overheating and risk starting a fire. Test your circuit and the environment in which it is deployed thoroughly before leaving it switched on and unsupervised. Always follow all fire safety precautions.**

## 6. PRODUCT FEATURES

- Works directly with Industrial standard DC power 12-24V.
- Two isolated Input and Two isolated output are accessible to user.
- Both input and output are 12-24V voltage level compatible.
- WiFi with MQTT or HTTP protocol
- The commands are provided in this document to inputs and outputs.
- Basic Firmware to enter SSID and password to connect to the router
- Firmware has ability to control device through HTTP and MQTT mode.
- Push Button can be connected to reset the configuration.

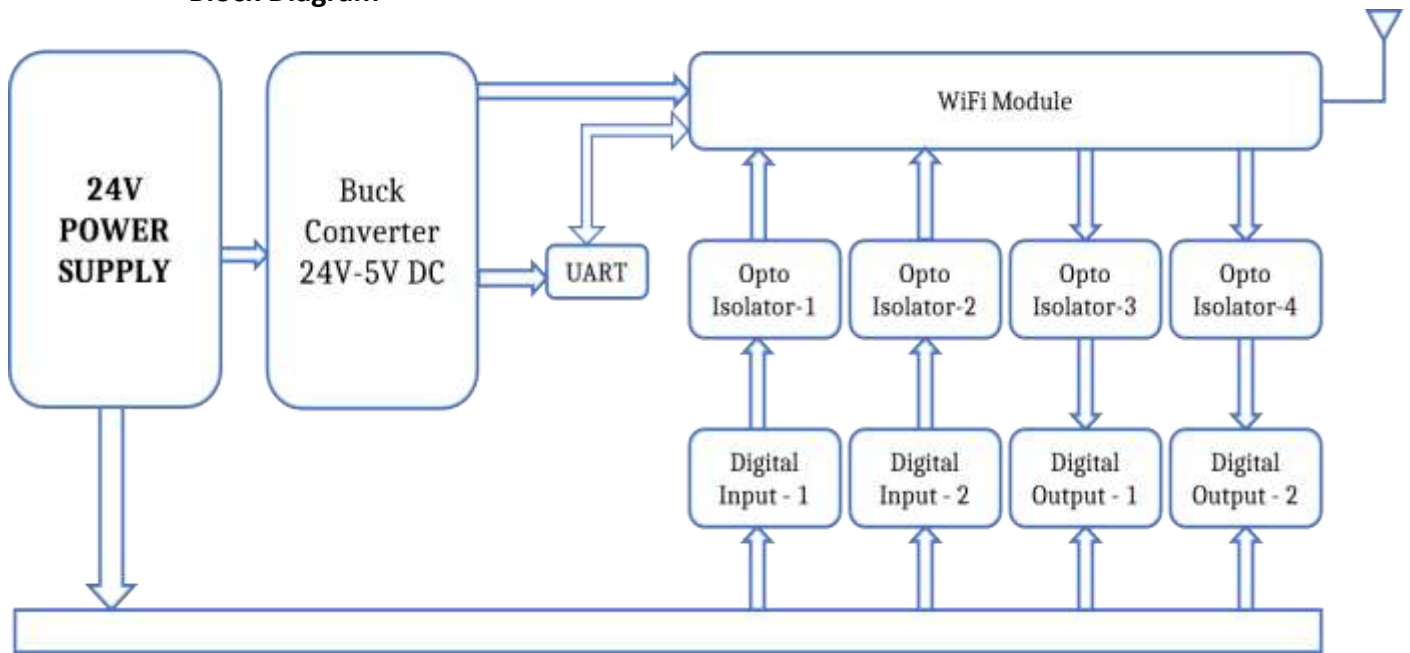
**7. PRODUCT DESCRIPTION**

**a. PHYSICAL DESCRIPTION**

- DC to DC Power supply module
- Isolated Inputs – 2 numbers
- Isolated outputs – 2 numbers
- Wifi Module

**b. FUNCTIONAL DESCRIPTION**

**Block Diagram**



**Figure 1: Block Diagram**

Two Input and board has on-board power supply module which takes industry standard 24V DC power as input and provides required regulated DC voltage as output. The regulated DC voltage is used to power-up Wifi module used on board to establish Wifi communication with Wifi routers or access points. The board has two optically isolated inputs and two optically isolated outputs to monitor sensors and control (ON/OFF) four external electrical DC loads like solenoids or relays independently from a mobile application using MQTT/HTTP protocol.

**8. SYSTEM OVERVIEW**

**1. AC to DC Power supply module**

The DC-DC converter on board is used to regulate voltage from 24 V DC to 3.3 V DC to supply power to complete digital part including Wifi module.

The main power input 24V supply is also used to provide limited power two isolated outputs to loads.

**2. Wifi Module**

Wifi module used on the board is ESP12 with all its required GPIOs are easily accessible to user for their own application. Wifi module is powered on through 3.3 V DC. It works on both MQTT / HTTP protocol.

3. Isolated Inputs – 2 Numbers

There are two numbers of optically isolated inputs given accessible to user to monitor sensors or read any digital inputs with voltage level between 12V DC – 24V DC. The optical isolation is used to protect the hardware from any electrical hazardous at/from external interfaces to the board like sensor or any other respective inputs.

4. Isolated outputs – 2 Numbers

There are two numbers of optically isolated outputs given accessible to user to control low power consumption loads with voltage level between 12V DC – 24V DC. The optical isolation is used to protect the hardware from any electrical hazardous at/from external interfaces to the board like solenoids, relays or any other respective outputs.

9. TECHNICAL SPECIFICATION

a. ELECTRICAL SPECIFICATION

Input Specifications				
Description	Min	Typ	Max	Unit
Voltage DC	12	24	24	Volts
Current DC	-	0.1	-	Amps
Power DC	-	3	-	Watts

Isolated Outputs Specifications (Maximum)				
Description	Min	Typ	Max	Unit
Voltage DC	-	-	24	Volts
Current DC	-	-	0.3	Amps
Power DC	-	-	0.72	Watts

Isolated Inputs Specifications (Maximum)				
Description	Min	Typ	Max	Unit
Voltage DC	-	-	24	Volts

b. MECHANICAL SPECIFICATION

- Mechanical Dimensions of PCB are 85 x 52 x 12 mm (Length x Width x Height)
- Mounting Holes (M3) at distance of 3mm from edges of board

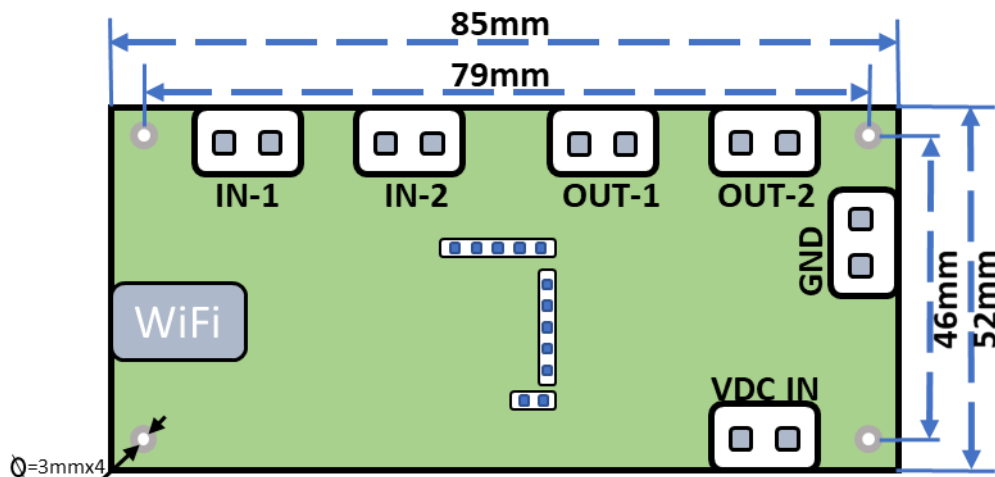


Figure 2: Board Dimensions

## 10. DEFAULT COMMANDS FOR IOs

Publishing Topic to read Inputs

Example: /sensorno/001

Subscription Topic to control outputs

Example: /outputno/001

### a. MQTT COMMANDS TO READ INPUT

- Generally, on change in status of input or sensors on the topic will relevant information. This can be captured by any system which has subscribed to topic which the sensor board Publish's ON.

From the above Ex. /sensorno/001 is our boards publishing topic, so if any system subscribes to this, it will receive the information on change in status.

### b. MQTT COMMANDS TO CONTROL OUTPUTS

- OUT1 – ex. /outputno/001; Topic publish from system.
- OUT2 – ex. /outputno/002; Topic publish from system.

Message to be published to control outputs:

xxxx\_00 – Turn Off an output

xxxx\_10 – Turn On an output

xxxx\_11 – Toggle an output

In the above commands, 'xxxx' can be any four alphabets. Note that, all the topics and commands are case sensitive.

### 11. ELECTRICAL CONNECTIONS

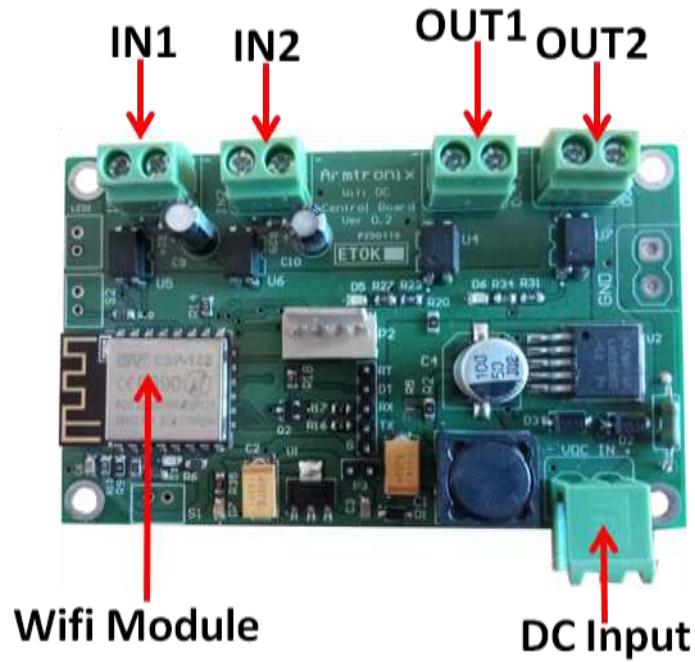


Figure 3: Header Details

Description of Header and Switches shown in Figure 3:

1. VDC\_IN      DC power input.
2. IN1        Digital Sensor input - 1.
3. IN2        Digital sensor input - 2.
4. OUT1       Digital Output - 1
5. OUT2       Digital Output - 2.

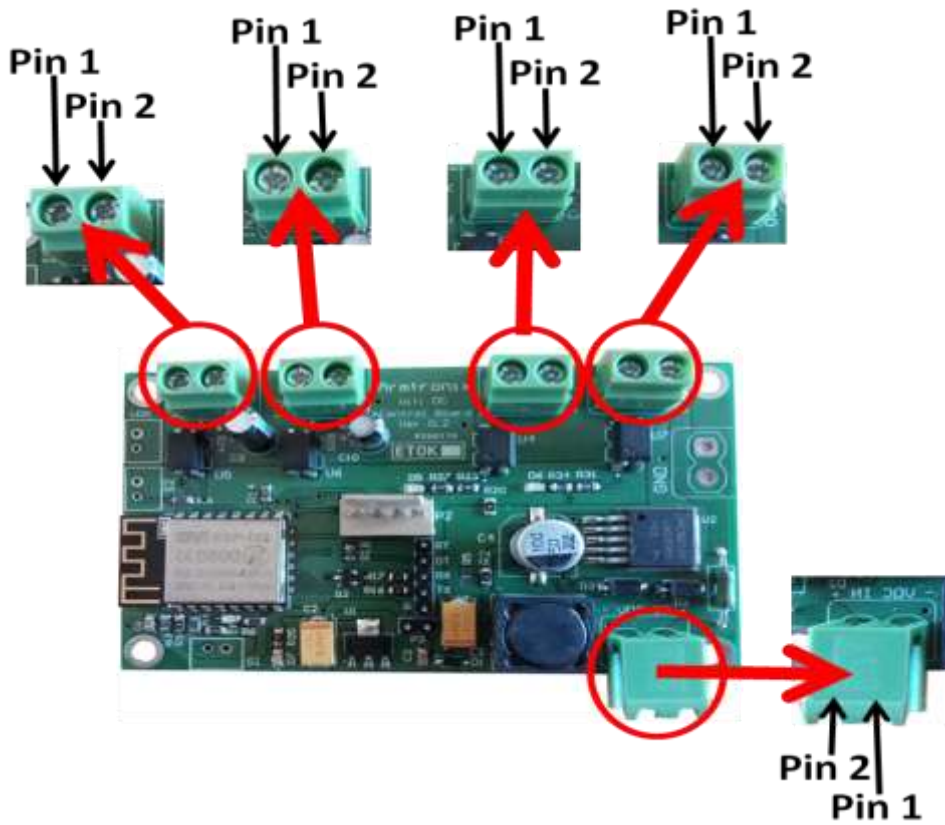


Figure 4: Header Pin Number References

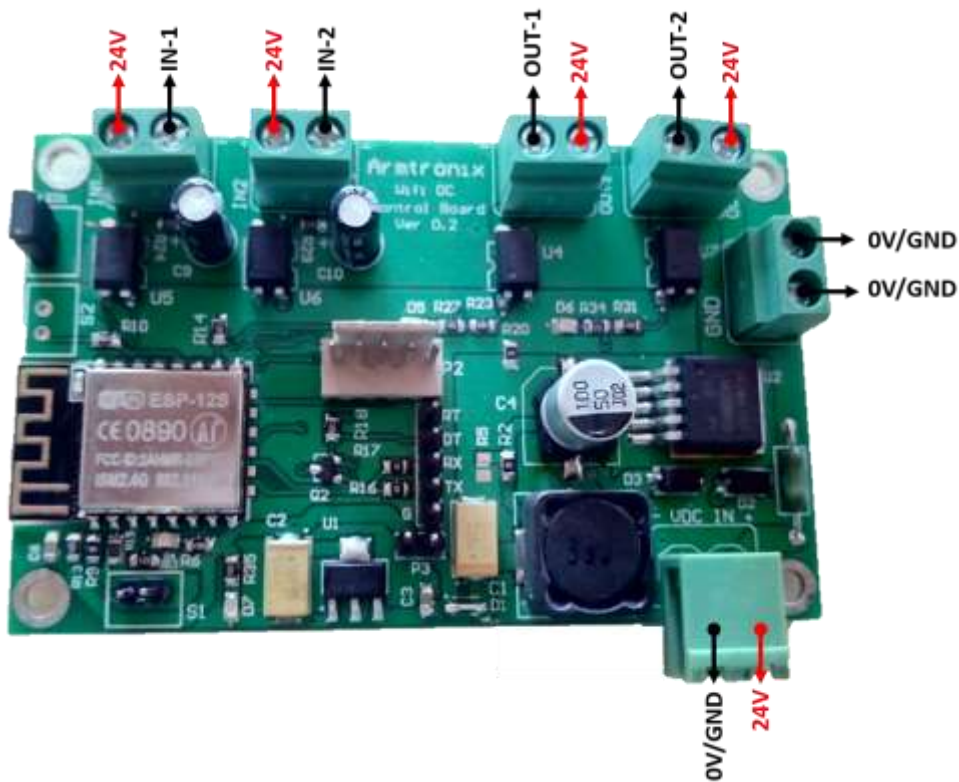


Figure 5: Header Pin Name References



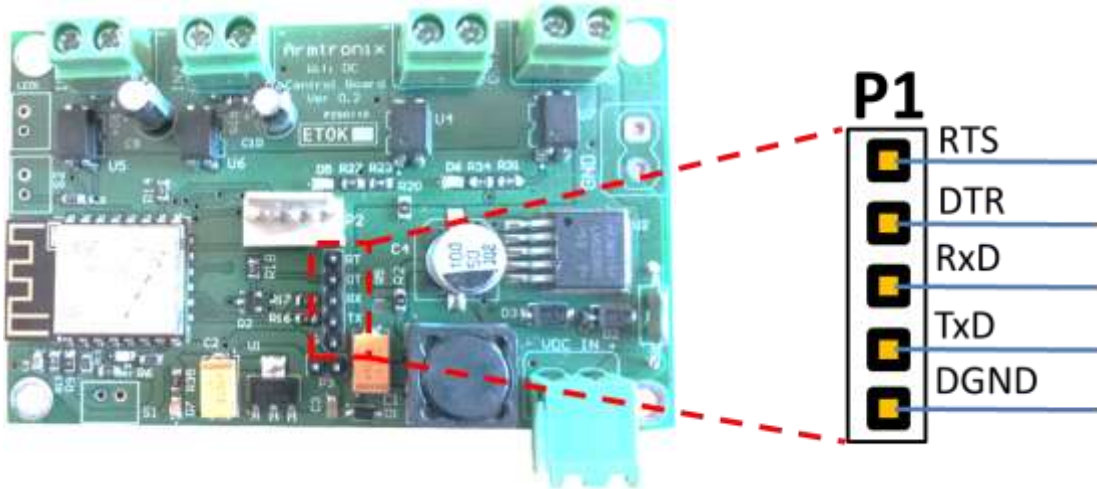


Figure 6: Programming Header Details

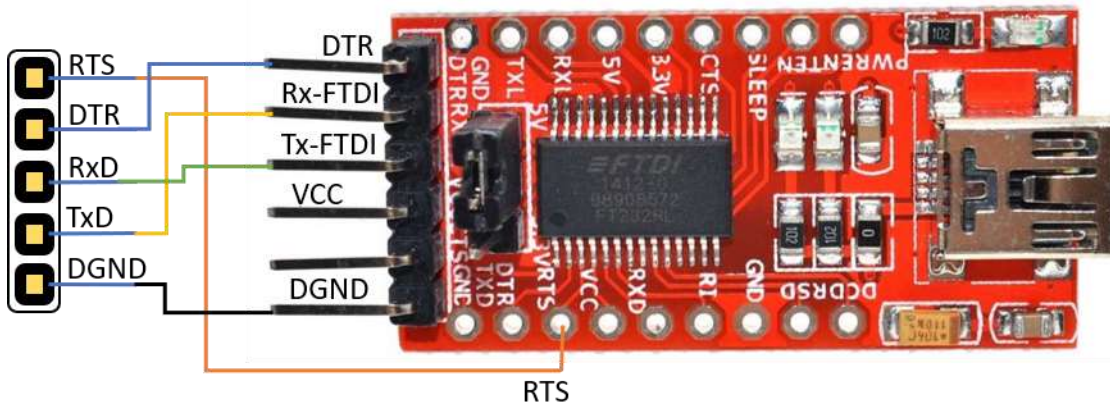


Figure 7: UART-USB Connection Details

a. HEADER PIN CONFIGURATION

i. HEADER IN1

Header Pin Number	Pin Name
1	24 V DC
2	SENSOR INPUT

Table 1: Header IN1 Pin Configuration

ii. HEADER IN2

Header Pin Number	Pin Name
1	24 V DC
2	SENSOR INPUT

Table 2: Header IN2 Pin Configuration

iii. HEADER OUT1

Header Pin Number	Pin Name
1	LOAD
2	24 V DC

Table 3: Header OUT1 Pin Configuration

iv. HEADER OUT2

Header Pin Number	Pin Name
1	LOAD
2	24 V DC

Table 4: Header OUT2 Pin Configuration

v. HEADER VDC\_IN

Header Pin Number	Pin Name
1	24 V DC
2	PGND

Table 5: Header VDC\_IN Pin Configuration

b. APPLICATION WIRING DIAGRAM

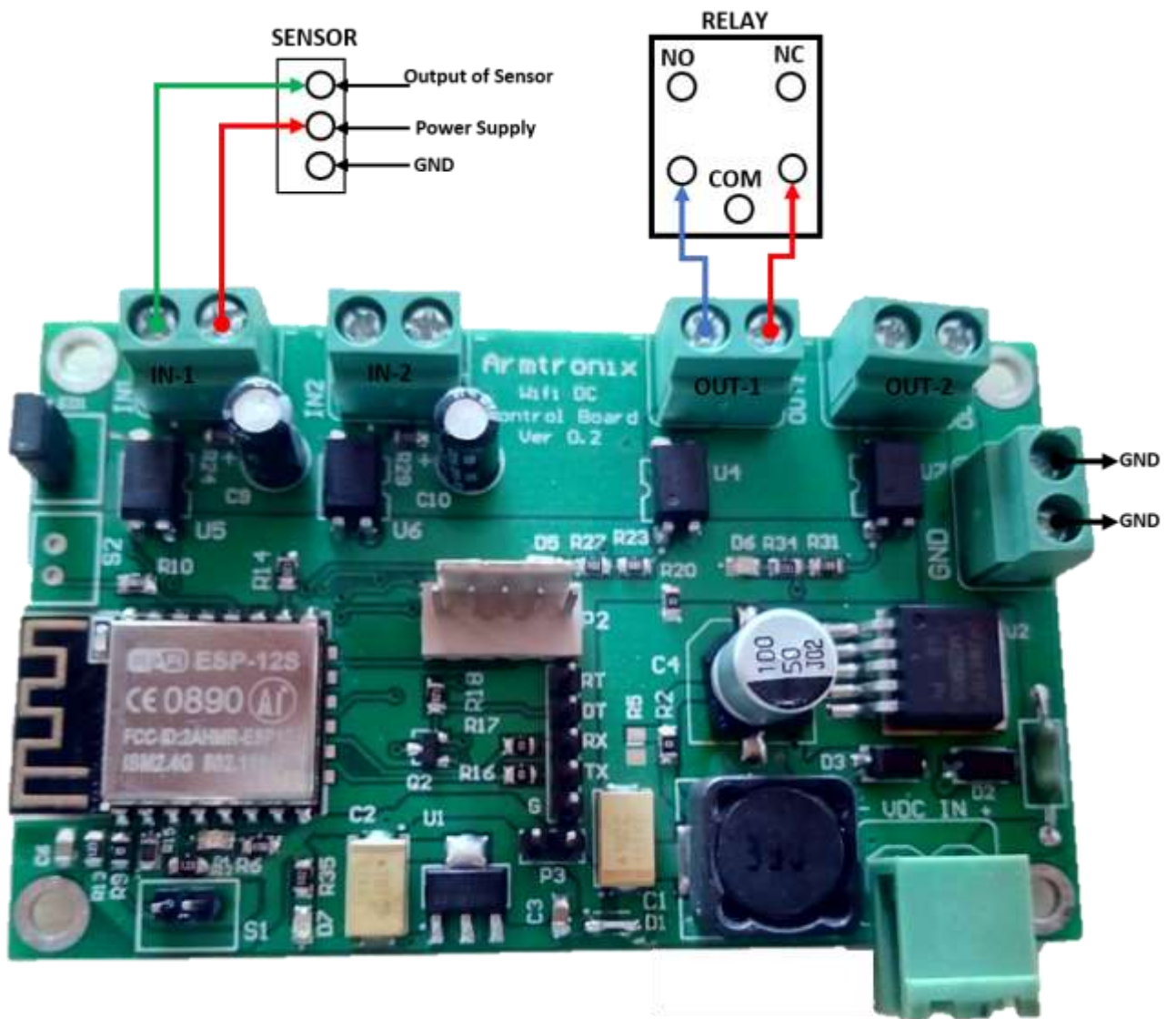
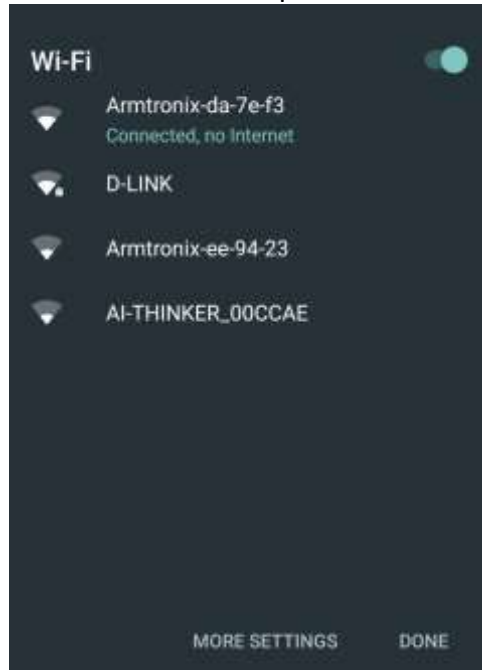


Figure 8: Application Wiring Example

## 12. HOW TO USE THE PRODUCT

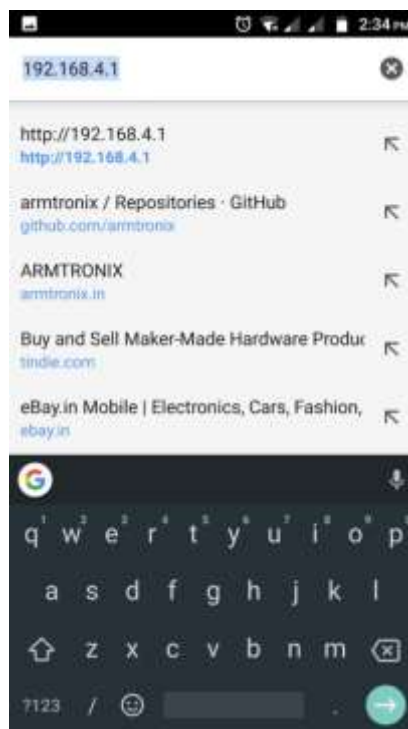
Power ON the device, so that, it will host the access point as shown in Figure 9,



**Figure 9: Device Hosting Access Point**

Connect the mobile to access point with Armtronix- (MAC ID). EX: Armtronix-1a-65-7 as shown in Figure 9.

After connecting, open browser and enter 192.168.4.1 IP address, it will open the web server as shown in the Figure 10,



**Figure 10: Enter Default IP Address**



Figure 11: Device Web Page Accessed



Figure 12: Enter SSID and Password and Other Details

fill the SSID and password and select MQTT, enter MQTT broker IP address, enter MQTT publish topic, then MQTT subscribe topic and submit. As there are dual inputs and dual outputs, two subscription topic and two publishing topics are assigned.

Publishing is for sensor information to be sent to some topic for defined application. Subscription is to send information to the board to control outputs.

After submitting configuration, the ESP 8266 will connect to the router and router assigns IP address to the ESP.

Once the ESP device connects to the MQTT broker, user will be able to access inputs or control outputs based on the application.



**DOCUMENT #:** IA008

**DOCUMENT REV:** B

**DOCUMENT NAME:** DESIGN DESCRIPTION, WIFI TWO INPUT TWO OUTPUT BOARD.

**IMPORTANT NOTICE**

ARMtronix Technologies LLP and its subsidiaries reserve the right to make corrections, enhancements, improvements and other changes to its products and services and to discontinue any product or service. Buyers should obtain the latest relevant information before placing orders and should verify that such information is current and complete. All products are sold subject to ARMtronix Technologies LLPs terms and conditions of sale supplied at the time of order acknowledgment.

The information in this document is subject to update without notice. The contents of this document thereof must not be used for any unauthorized purpose.

-----END OF DOCUMENT-----