

## DESCRIPTION DOCUMENT FOR WIFI TWO INPUT TWO OUTPUT BOARD

### **HARDWARE REVISION 0.2**

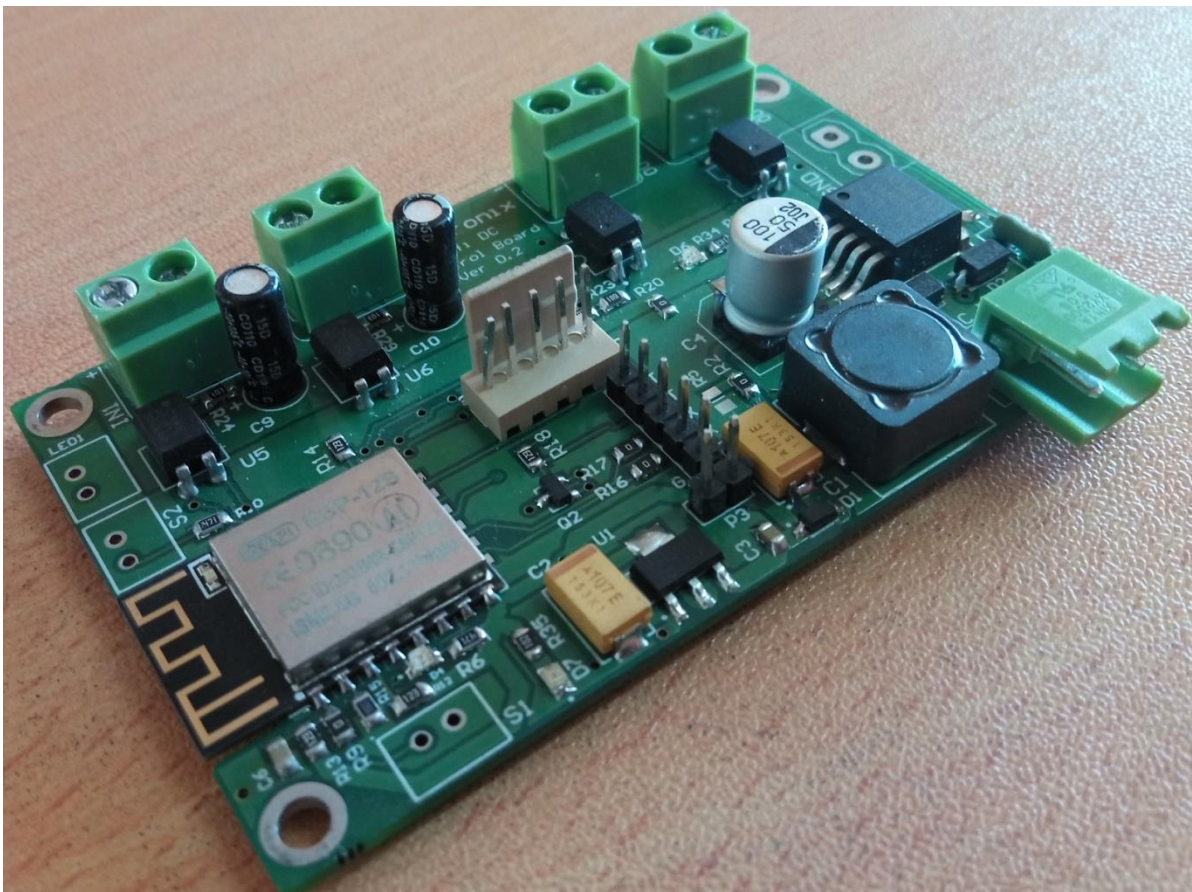
Department	Name	Signature	Date
Author			
Reviewer			
Approver			

#### Revision History

Rev	Description of Change	Effective Date
A	Initial Release	

#### 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.



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## 1. ABBREVIATIONS

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

## 2. REFERENCES

Company Website link	<a href="https://www.armtronix.in">https://www.armtronix.in</a>
Instructable's Weblink	
Github's Weblink	-

## 3. PURPOSE

The purpose of this document is to outline the design description for the Wifi Two GPIO 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.

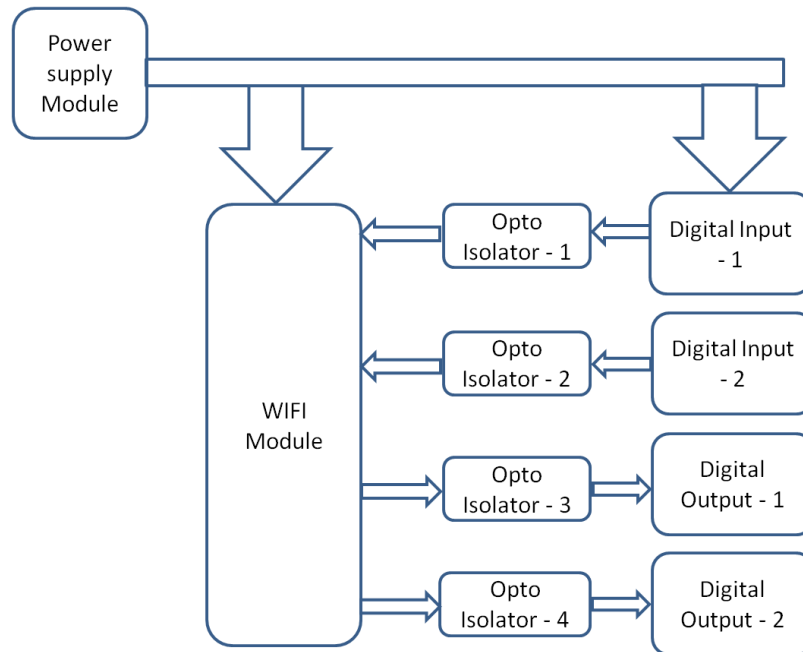
## 7. PRODUCT DESCRIPTION

### 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 for edges of board

## 10. 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

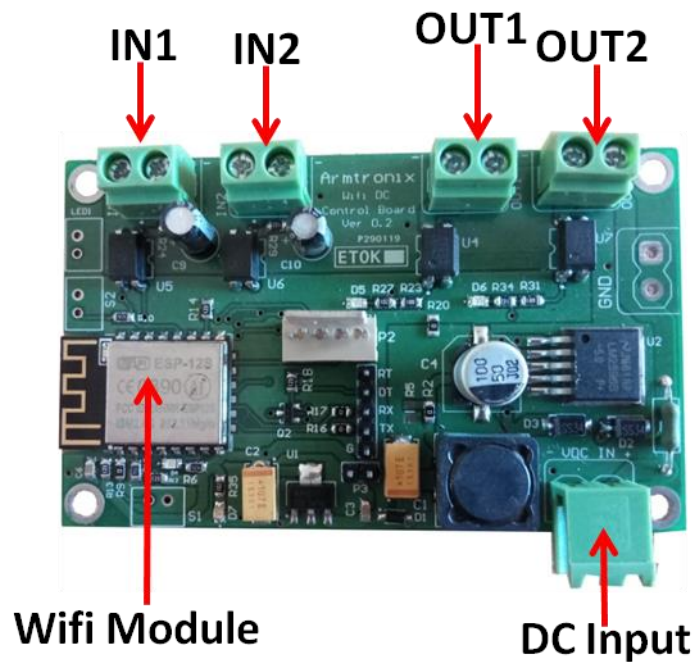


Figure 2: Header Details

Description of Header and Switches shown in Figure 2:

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.



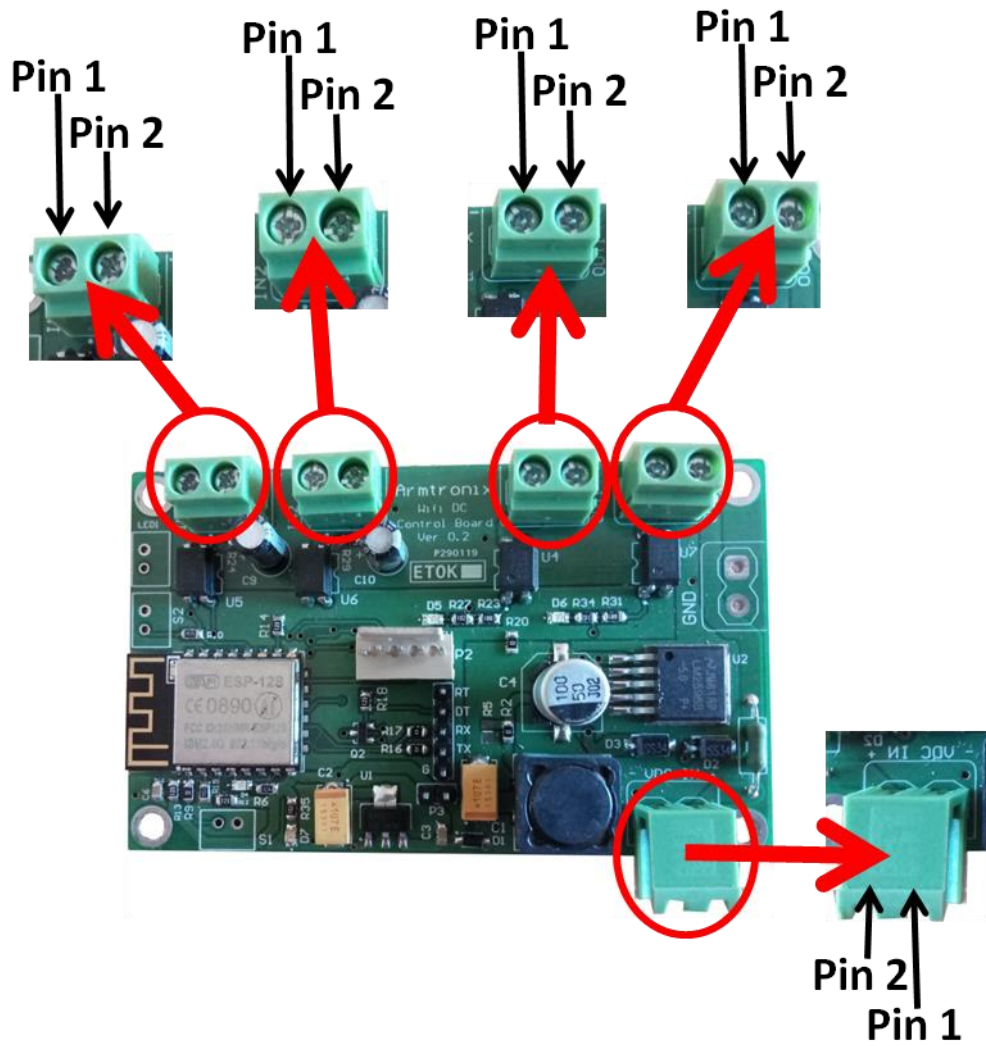


Figure 3: Header Pin number references

**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**

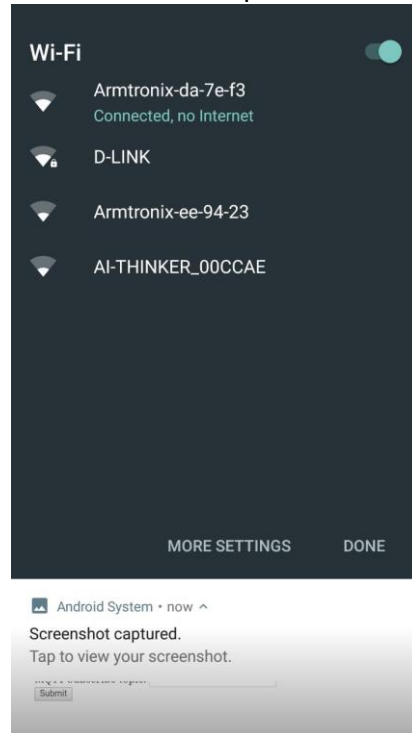
Header Pin Number	Pin Name
1	24 V DC
2	PGND

**Table 5: Header VDC\_IN Pin Configuration****b. APPLICATION WIRING DIAGRAM****Figure 4: Application wiring example**



## 12. HOW TO USE THE PRODUCT

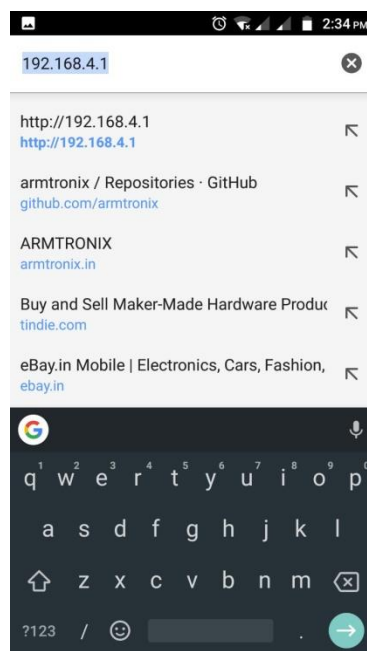
Power ON the device, so that, it will host the access point as shown in Figure 6,



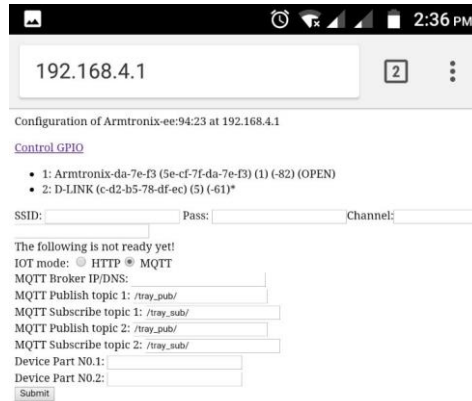
**Figure 5: Device hosting Access point**

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

After connecting, open browser and enter 192.168.4.1 IP address, it will open the web server as shown in the Figure 8,



**Figure 6: Enter Default IP address.**



192.168.4.1

Configuration of Armtronix-ee:94:23 at 192.168.4.1

[Control GPIO](#)

- 1: Armtronix-da-7e-f3 (5e-cf-7f-da-7e-f3) (1) (-82) (OPEN)
- 2: D-LINK (c-d2-b5-78-df-ec) (5) (-61)\*

SSID: Pass: Channel:

The following is not ready yet!

IOT mode: ☐ HTTP ☒ MQTT

MQTT Broker IP/DNS:

MQTT Publish topic 1: /tray\_sub/

MQTT Subscribe topic 1: /tray\_sub/

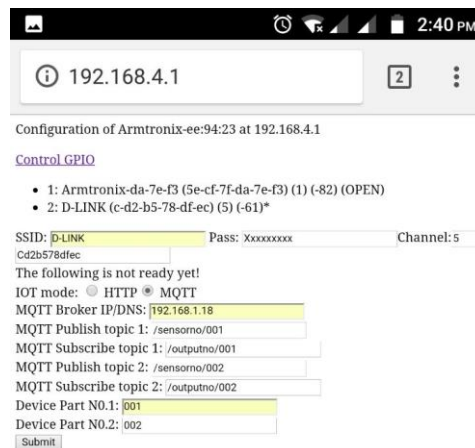
MQTT Publish topic 2: /tray\_sub/

MQTT Subscribe topic 2: /tray\_sub/

Device Part NO.1:

Device Part NO.2:

Figure 7: Device Web page Accessed



192.168.4.1

Configuration of Armtronix-ee:94:23 at 192.168.4.1

[Control GPIO](#)

- 1: Armtronix-da-7e-f3 (5e-cf-7f-da-7e-f3) (1) (-82) (OPEN)
- 2: D-LINK (c-d2-b5-78-df-ec) (5) (-61)\*

SSID: D-LINK Pass: XXXXXXXXXX Channel: 5

The following is not ready yet!

IOT mode: ☐ HTTP ☒ MQTT

MQTT Broker IP/DNS: 192.168.1.18

MQTT Publish topic 1: /sensorno/001

MQTT Subscribe topic 1: /outputno/001

MQTT Publish topic 2: /sensorno/002

MQTT Subscribe topic 2: /outputno/002

Device Part NO.1: 001

Device Part NO.2: 002

Figure 8: 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:** A

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

#### **IMPORTANT NOTICE**

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