MuseLab WiFi IoT Robotic Shield for BBC Micro:Bit
Quick Start Guide

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Introduction

“Muselab WIFI IoT Shield” is one of the latest and most powerful IoT shields that is presently available in the market. The shield (with the Muselab edge connector) is developed by MuseLab. When you insert your Micro bit into the edge connector, your Microbit will be WIFI enabled. In other words, Microbit is able to access the Internet using our MuseLab shield.

Structure diagram

There is a screen, 3v/5v switch and a WIFI module on the shield. The screen is indeed very useful - it shows the information like IP address and the battery status. For the switch, you can alter the output voltage of the 4 i/o pins.
There are 4 input/output pins, 1 I2C pin for you to do the project! You can insert different input like light and sound sensors. For output, you can use LED, buzzer, servo and so on.

**Detailed pinout table:**

<table>
<thead>
<tr>
<th>Module</th>
<th>Pin</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>General</td>
<td>3V/5V</td>
<td></td>
</tr>
<tr>
<td></td>
<td>GND</td>
<td></td>
</tr>
<tr>
<td>I/O</td>
<td>P0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>P1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>P2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>P12 Write only</td>
<td></td>
</tr>
<tr>
<td>Servo</td>
<td>D5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>D6</td>
<td></td>
</tr>
<tr>
<td></td>
<td>D7</td>
<td></td>
</tr>
<tr>
<td></td>
<td>D8</td>
<td></td>
</tr>
<tr>
<td>WIFI</td>
<td>P16 (RX)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>P8 (TX)</td>
<td></td>
</tr>
<tr>
<td>I2C</td>
<td>P19 (SCK)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>P20 (SDA)</td>
<td></td>
</tr>
</tbody>
</table>
How to program MuseIoT on micro:bit

➢ To program Muselab modules with micro:bit, you will need to add the Muselab PXT packages to your makecode environment.

STEP 1: Find the “Add Package” option at the bottom.

STEP 2. Enter the project URL: github.com/MUSELAB/pxt-wifi-shield

STEP 3. You can find “MuseIoT” under Basic!
1. Print “Hello World” on the screen

STEP 1: Go to Advanced -> Add Package

STEP 2: Search “SSD1306” and click that.

Add Package... ?

SSD1306

ssd1306-microbit
PXT package for using the SSD1306 OLED controller with the BBC micro:bit
STEP 3: After you have added it, you can see the OLED in the menu.

STEP 4: Initialize the OLED first. The height is 32 and width is 128.

STEP 5: Show the string “Hello World”

STEP 6: To clear the screen, add the “clear OLED display” command.
2. How to use Input/Output pin?

### 2.1 Read input value

STEP 1: Insert the input sensor on P0.

Please note that there is label SVG on the pin.

STEP 2: Pins -> analog read pin P0
2.2 Turn on the output

STEP 1: Insert the output on P1.

Please note that there is label SVG on the pin.

STEP 2: Pins -> analog write pin P1 to 1023 and 0 every 1 second repeatedly.
2.3 Control 180° servo

STEP 1: Insert the 180° servo to the D5.

STEP 2: MuseIoT -> More -> control 180° servo pin 5 to degree 0 and 180 repeatedly.

2.4 Control 360° servo

STEP 1: Insert the output on P1.

STEP 2: MuseIoT -> More -> control 360° servo pin 6 to speed 100% or 50% on start.
3. Basic WIFI function

- Before you use the wifi module, you have to do the following 2 steps first.
  1. Initialization of WIFI module
  2. Get the response from the wifi module

3.1 Initialization of Muse IoT Shield

STEP 1: Go to MuseIoT -> Initialize WiFi IoT Shield

3.2 Get the response from the WIFI module

STEP 2: Let’s see what happened when WIFI module receive the command.
STEP 3: Let’s see what happened when WIFI module is initialized.

STEP 4: Add the screen function to show the response from WIFI module.

If you open the shield, the screen will show shield information after “Initialize OK”. The information contains the version number firmware version number and the battery level.
3.3 Connect Micro:Bit to the Internet

STEP 1: Send the connect wifi command by pressing button

STEP 2: find the Set wifi from “MuseIoT” tab.

STEP 3: Input ssid and pwd where muselab is wifi ssid and 12345678 is the wifi password.

Result:
➢ When it is connected, the IP address will be shown.
4. Upload data to ThingSpeak

STEP 1: Send the ThingSpeak command by pressing B button.

STEP 2: Find the “Send ThingSpeak” from “MusIoT” tab.

STEP 3: Find the Key from ThingSpeak, you need to use your own API key.

STEP 4: Input the key where “QPATAJ6QA4S83WSI” is the ThingSpeak API key and field1 is the value you want to upload.

Result:
➢ If data is uploaded successfully, “Uploaded OK” will be shown.
5. Send email via IFTTT

STEP 1: Send the IFTTT command by pressing A+B button.

STEP 2: find the “Send IFTTT” from “MuseIoT” tab.

STEP 3:
Find the IFTTT API key and event name, go to IFTTT page.
STEP 4:

Input the information, example
1. IFTTT API key: dlJ0cMtOPkAddxCTPKCxgE*
2. value 1 or value 2: the value you want to send with.
3. event_name: the event you want to trigger.

Result:

➢ If data is uploaded successfully, “Uploaded OK” will be shown.
Introduction to the cloud - ThingSpeak

1. What is ThingSpeak
   - It is the platform for you to upload data to the cloud.

2. ThingSpeak registration
   1. Go to https://thingspeak.com/, and signup.
   2. In the Channels tab, click “My Channels” -> New Channel.
   3. Input the Name, Field1 and Field2 as shown below. And click “Save Channel”.

   ![New Channel Form](image)
3. ThingSpeak API

- What is ThingSpeak API? It is the URL link for your quickly upload data to ThingSpeak.
- You can just type the URL link (ThingSpeak API) in the browser, then it's done!

STEP 1: Find the API link from “Data Import/Export” tab

STEP 2: Enter the API link in the browser.

3. Paste the link you have copied

4. Upload data to the chart successfully
1. Send testing command to Micro:Bit

STEP 1: Send the “send AT test” command by shaking it!

STEP 2: Send the command by shaking it!

If you open the shield, the screen as shown below “AT+OK” will be returned.

2. Get battery level from WiFi IoT Robotic Shield

STEP 1: Send the “send AT test” command by shaking it!

STEP 2: Send the command by shaking it!

If you open the shield, the screen as shown below. “AT+OK” will be returned.