

How To: Arduino (Mega 2560) with WiFi and Grove Shield

Description

The Arduino Mega is a microcontroller board based on the ATmega2560. It has 54 digital input/output, 16 analog inputs, a 16 MHz crystal oscillator, a micro USB connection, a power jack, an ICSP header, and a reset button. For this example, the microcontroller board will be fitted with a WiFi and a Grove Base shield.

This guide will provide the step-by-step details on how to assemble, configure, and load the Arduino Mega 2560 to publish the following data:

- Information Log Messages
- Location Data (Latitude, Longitude, etc.)
- Sample Attribute Information
- Simulated Alarms
- Analog Potentiometer (Rotary) Data

This example will also demonstrate cloud methods to turn on/off an LED and sound a buzzer for a defined period of time.

Software Prototyping Platform

The Arduino open-source software prototyping platform will be used throughout this guide. Arduino includes an integrated development environment (IDE) that is compatible with the Mega 2560 microcontroller board.

Requirements

The following items are requirements for a working IoT:

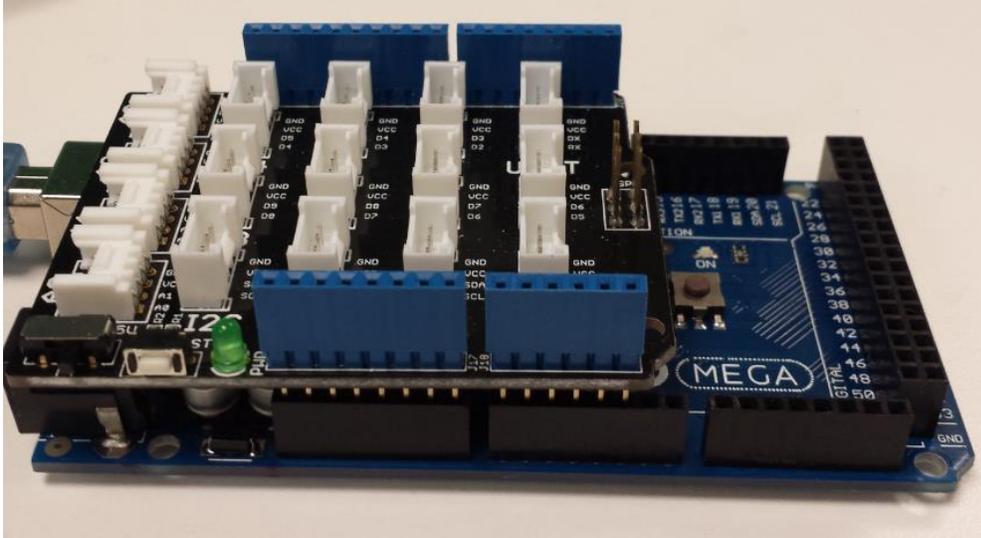
- Arduino Mega 2560 Prototype Board
- Arduino WiFi Shield R3
- Seeed Grove Base Shield V2 (SKU: 103030000)
- Windows Compatible PC with Internet Access
- Arduino Prototyping Platform (steps outlined below)

Setup

Setup for the IoT consist of these steps:

1. Signup for an M2M Account on the Management Portal
2. Download the getting started file from the Management Portal
3. Create a new “Thing” Definition on the Management Portal
 - Open the downloaded file and extract the ‘ArduinoThingDef.json’ file to your PC’s desktop
 - Select ‘Developer’ from the Management Portal
 - Click on ‘Thing definitions’ and then click the ‘Import’ button
 - Click the ‘Attach File’ button and select the JSON file copied in the previous step
 - Press the ‘Import’ to import the thing definition into the ORG
4. Create an Application token for your thing definition
 - Select ‘Developer’ from the Management Portal
 - Click on ‘Applications’ and then click the ‘New Application’ button
 - In the ‘Name’ field enter ‘ArduinoApp’
 - In the ‘Description’ field enter ‘Arduino App’
 - In the ‘Auto Registration Thing Definition ID’ select ‘Arduino IoT’
 - Check the ‘Org Admin’ checkbox and press the ‘Add’ button
 - Record the ‘Token’ ID that is provided for a subsequent step – this is your Application token

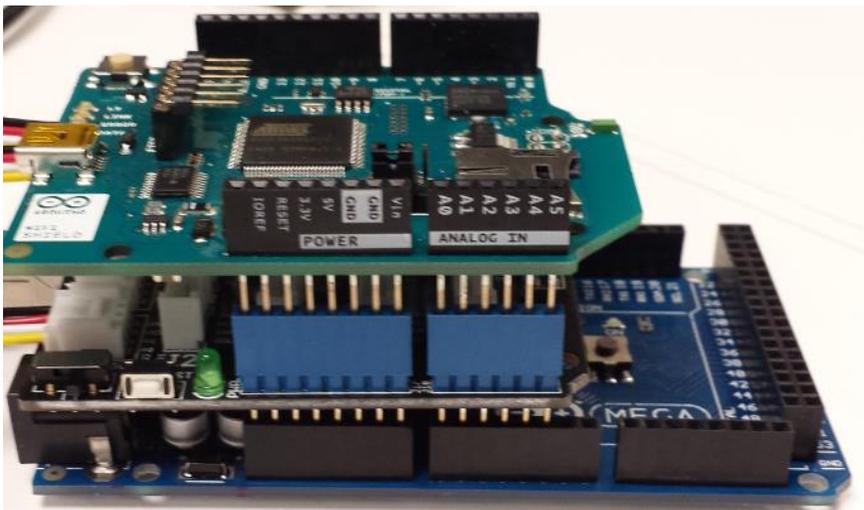
5. Connect the Grove Base shield to the Arduino MEGA as shown below – note the placement and direction of the boards (Do NOT connect the USB cable to the computer at this point.)



6. Connect the Grove sensors to the Grove Base shield as listed below:

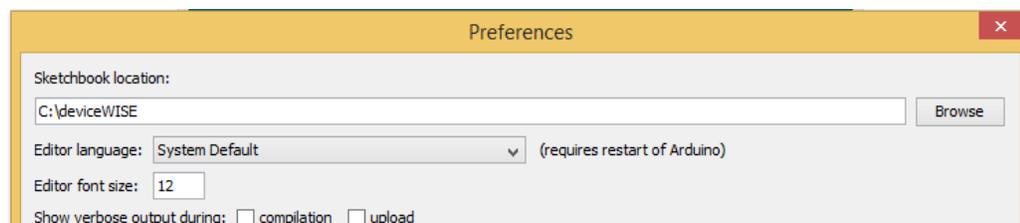
- LED Socket to D2
- Buzzer to D4
- Rotary Angle Sensor to A0

7. Connect the Arduino WiFi shield to the Grove Base shield as shown below – ensure that ALL pins are mated to the Grove Base shield.

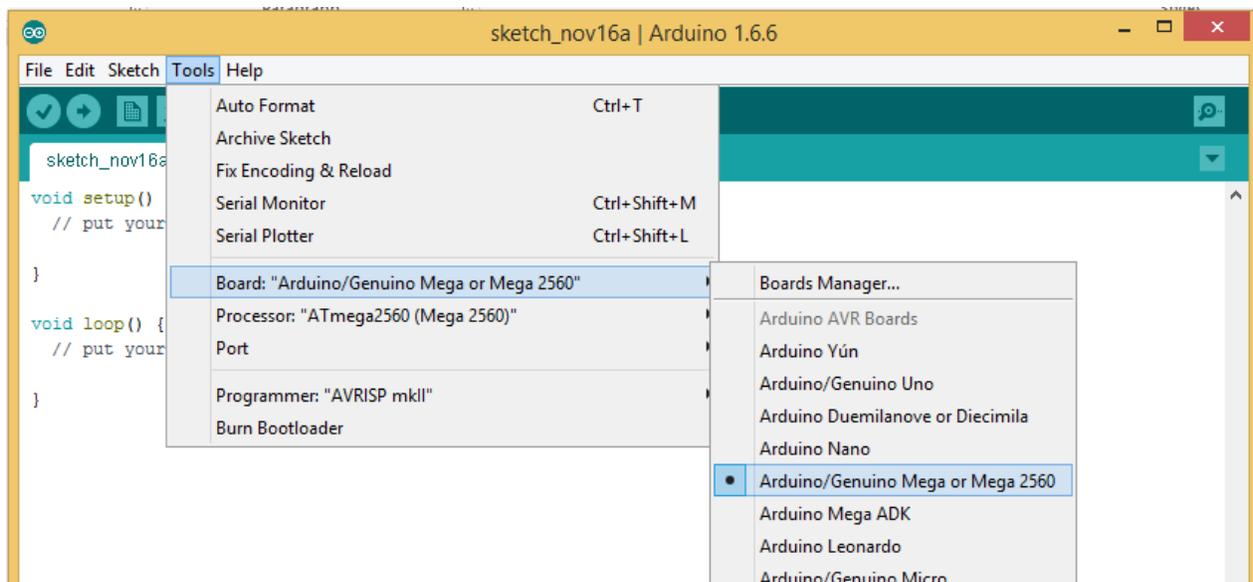


8. Install the Arduino IDE

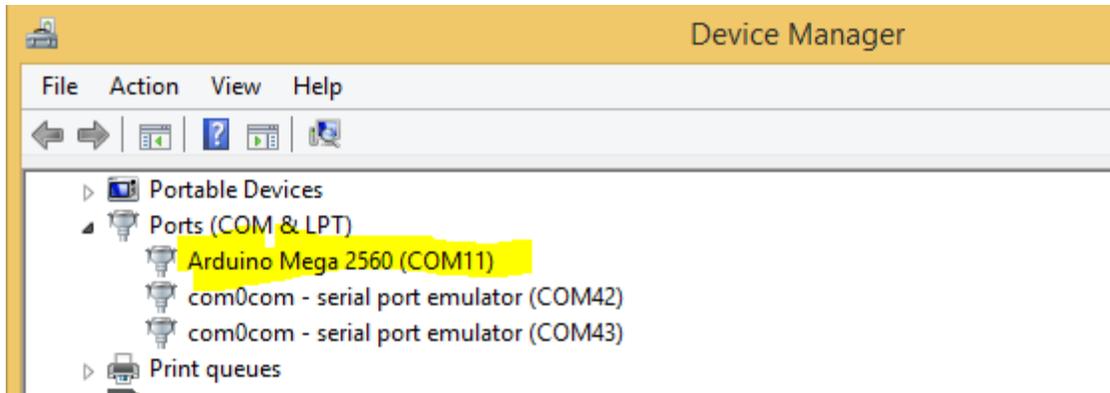
- Using Windows Explorer, create a deviceWISE folder on the C: (ie C:\deviceWISE)
- Download the Arduino package from [here](#)
- Open the downloaded file (should be located in your 'Downloads' folder).
- Run the Arduino installer and follow the prompted instructions
- Connect the USB Cable from the Arduino to the Windows computer
- Open Arduino by double clicking on the Desktop shortcut
- Select 'File' from the Arduino menubar and then 'Preferences'
- Enter "C:\deviceWISE" into the "Sketchbook location" field and press "OK"



- Select 'Tools' from the Arduino menubar then 'Board' and afterwards Arduino Mega 2560



- Open the Windows "Device Manager" on your computer
- Find your "Arduino Mega 2560" under "Ports" and take note of the COM port assigned (COM11 in this specific example)

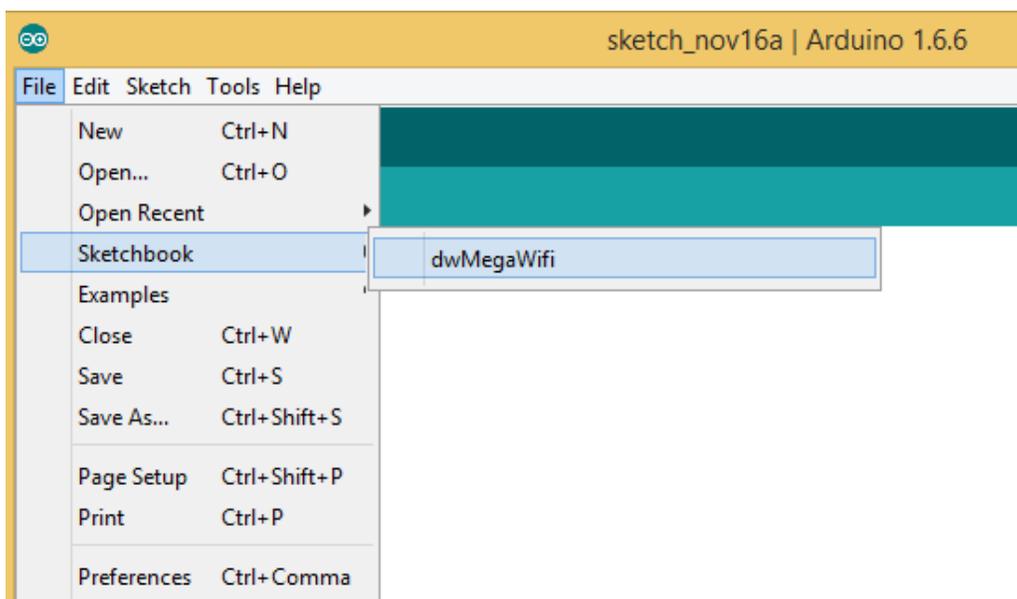


- On the Arduino IDE, select 'Tools' from the menubar and then 'Port'. Select the displayed COM port so it has a ✓ (Check) mark.
- Exit Arduino by selecting "File" and then "Quit" from the Arduino menubar.

9. From within the file downloaded in step 2

- Copy the "dwMegaWifi" folder into C:\deviceWISE. This will result in a "C:\deviceWISE\dwMegaWiFi" folder.
- Copy the "libraries" folder into C:\deviceWISE. This will result in a "C:\deviceWISE\libraries" folder.

10. Open the Arduino IDE and select File->Sketchbook to load in the sample dwMegaWifi sketch.



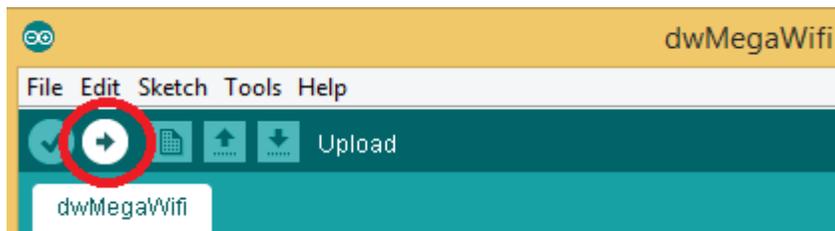
11. Find the WiFi SSID and PW labels within the Arduino sketch and enter the appropriate WiFi UserID and Password for your WiFi network.

```
//Wi-Fi Network - SSID / Password
#define WIFI_SSID      "UserGUEST"
#define WIFI_PW       "UserPassword"
```

12. Find the Application Token label within the Arduino sketch and enter the m2m Application Token that was obtained in step 4 above.

```
// Authentication/Registration Details
#define DWOPEN_APPTOKEN  "Igp21z2ghabxqw7J" //Application Token
```

13. Compile and load the demo program onto the Arduino by pressing the "Upload" arrow button



14. After the Upload completes, press the "<Shift><Ctrl>M" keys to display the demo program output
15. Open the "Things" page on the Management Portal to display your device
16. Open your 'Thing' device by clicking the 'view' icon (the eyeball) next to your device. All your device's details are displayed on this page.
17. Rotate the Rotary sensor to generate rotary property data and to simulate alarm generation
18. Use the 'Methods' tab to turn ON and OFF the LED
19. Use the 'Methods' tab to sound the buzzer for a defined period of time