

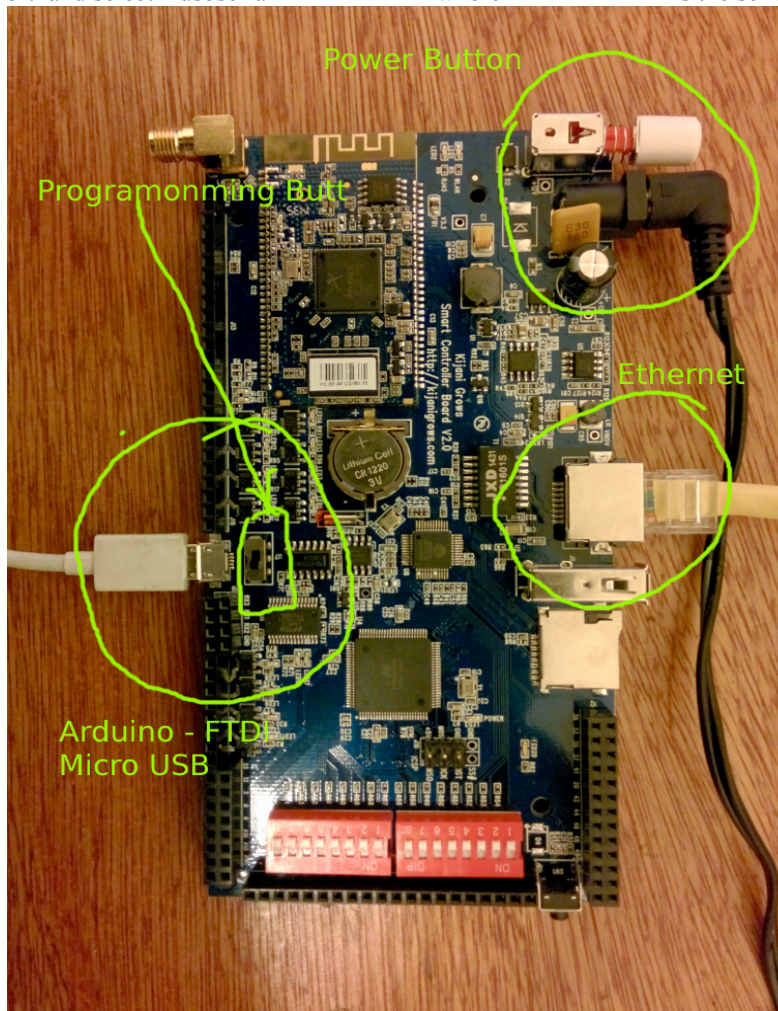
Kijani Grows MakeSF 1-Wire Project

Eric Maundu, Malcolm Knapp

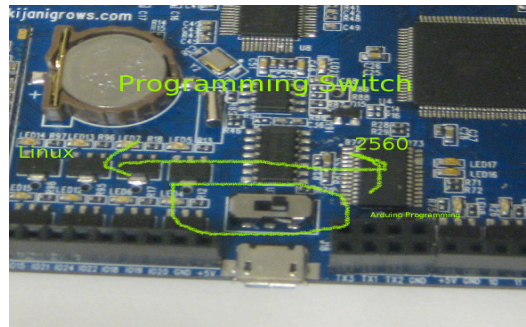
Part 1 Sensor Testing

Hello World Arduino Side

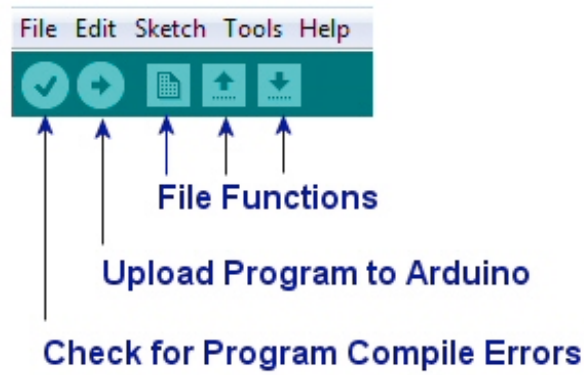
1. Power Board
2. Press on Power Button
3. Plug in micro USB
4. Open Arduino IDE
5. In the IDE go to Tools → Board and select “Arduino Mega Arduino Mega2560”
6. Go to Tools → Port and select “usbserial-XXXXXXXX” where “XXXXXXXX” is the serial number of the board



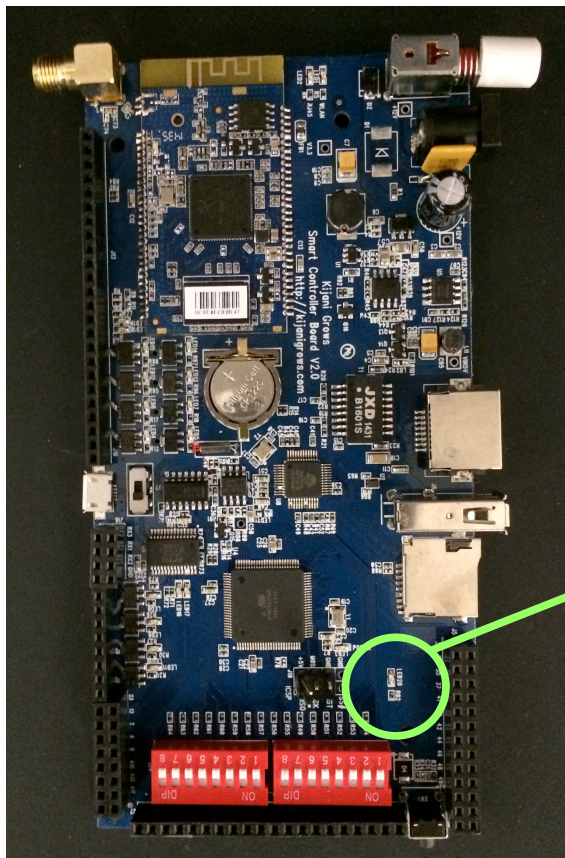
7. Switch Programming Switch to the Arduino side



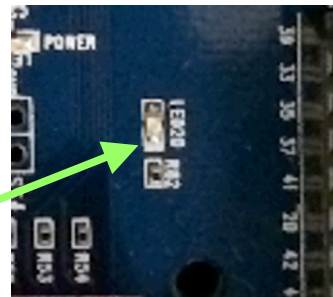
8. Open Example → Basics → Blink
9. Press the Upload Button to load the program



10. LED20 should start blinking

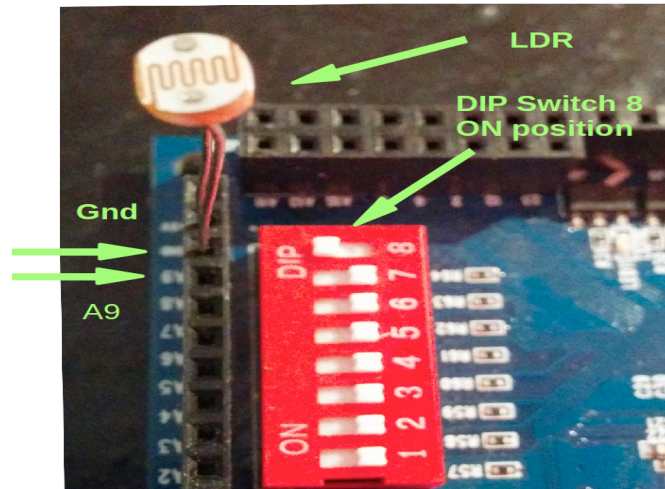


LED 20



Analogue Sensors – Photocell light Sensor Test

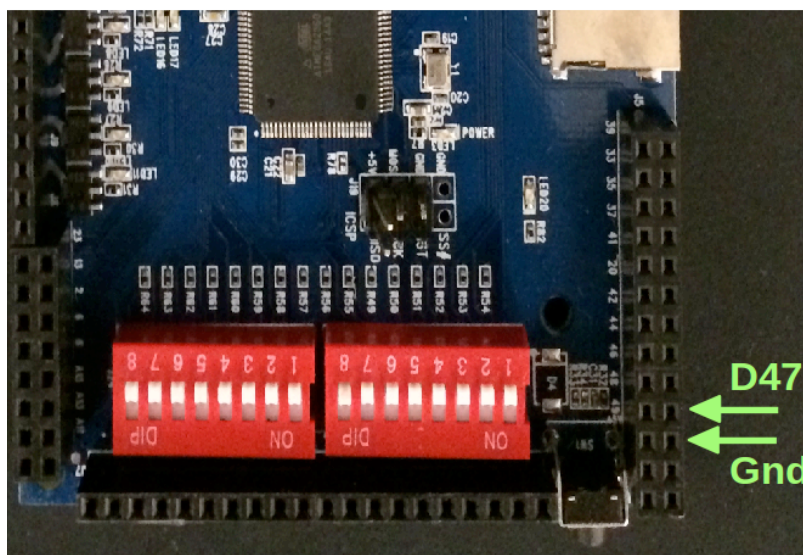
11. Insert Light into GND and A9
12. On the Analog Header turn Switch 8 to ON



13. Open Example → Analog → AnalogIn
14. Change sensor pin from A0 to A9
15. Upload the program in the same way as before
16. LED 20 should start blinking. Cover the sensor with your finger to make it blink slower or shine phone light on it to make it blink faster.

Digital Sensors - Float Switch Test

17. Insert Float Switch into GND and Pin 47



18. Open Example → Digital → DigitalInputPullUp

19. Change line 28 of the code from

```
pinMode(2, INPUT_PULLUP);
```

to

```
pinMode(47, INPUT_PULLUP);
```

20. Change line 35 of the code from

```
int sensorVal = digitalRead(2);
```

to

```
int sensorVal = digitalRead(47)
```

21. Upload the program

22. Test by turning the float switch up and down. LED20 should turn and off.

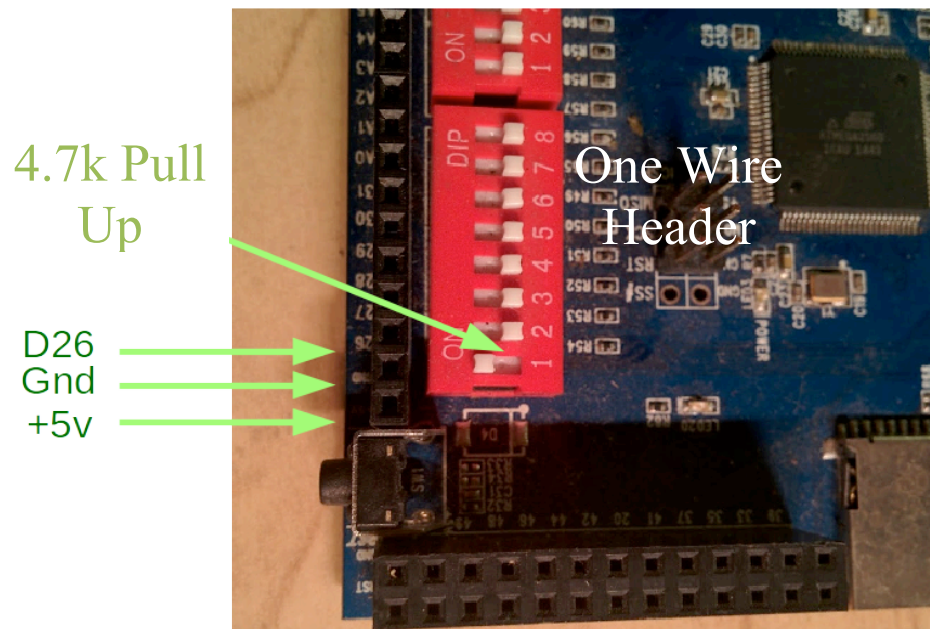
Set Up Sensor Hardware

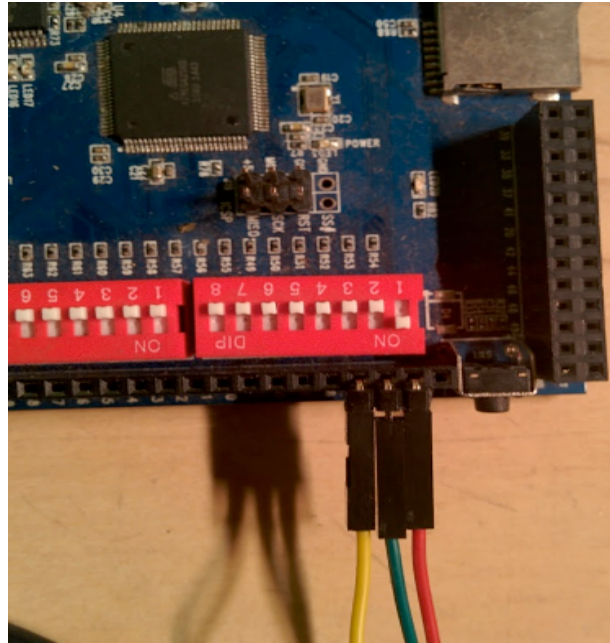
23. On One Wire Header turn switch 1 to ON

24. Insert probe data (Yellow) into pin26

25. Insert probe GND (Blue) into GND

26. Insert probe power (red) into 5V





Add Libraries

27. Navigate to <http://www.kijanigrows.com/support/downloads/>
28. Download zip file libraries.zip
29. Uncompress Zip file
30. Install the Dallas Temperature and One Wire libraries by copying all folders into the following directories
 1. For Mac - Documents/Arduino/libraries
 2. PC - My Documents\Arduino\libraries
31. Restart Arduino
32. Open Examples → OneWire → DS18X20 Temperature to confirm libraries are loaded

Serial Sensors – 1-Wire Temperature Sensor Test

33. In DS18X20 Temperature change line 10 of the code from

```
OneWire ds(10); // on pin 10 (a 4.7K resistor is necessary)
```

to

```
OneWire ds(26); // on pin 10 (a 4.7K resistor is necessary)
```

34. Upload Code
35. Open Serial Monitor



36. You should see a result that looks something like this

```
ROM = 28 71 53 C9 4 0 0 5E
Chip = DS18B20
Data = 1 A1 1 4B 46 7F FF F 10 D9 CRC=D9
Temperature = 26.06 Celsius, 78.91 Fahrenheit
```

Part 2 Kijani Setup

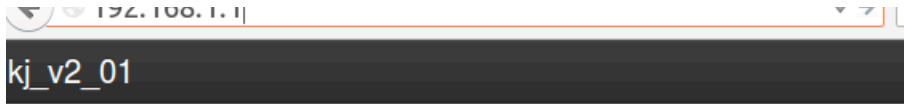
Arduino Side

37. Open Load v2_json_io
38. Load Code
39. Open Serial Monitor
40. Set baud rate to 115200
41. Confirm sensor work as expected

Getting Online

<http://www.kijanigrows.com/faqs/how-do-i-assign-a-unique-host-name-to-a-v2-controller/>
http://www.kijanigrows.com/kb/v2_board-how-to-connect-to-a-new-wifi-network/

42. Remove micro USB
43. Set Up Ethernet Connection
 1. Steps for Mac
 1. Open System Preferences —> Network
 2. Click the “+” sign to create a new service
 3. Select “USB Ethernet” from the drop down menu
 4. Click Create
 2. Steps for PC
 1. None needed. The Ethernet should automatically register the Ethernet port
44. Connect in Ethernet cable
45. In a browser enter to 192.168.73.1 in the navigation bar
46. Wait for the login webpage to load



Authorization Required

Please enter your username and password.

Username

Password

Powered by [LuCI 0.12 Branch \(0.12+git-15.037.36195-f1e2a26\)](#) OpenWrt Barrier Breaker r42853

47. The default setting is uses no password so click Login. The management dashboard should appear



Status

System

Hostname	kj_v2_01
Model	Oolite V1.0
Firmware Version	OpenWrt Barrier Breaker r42853 / LuCI 0.12 Branch (0.12+git-15.037.36195-f1e2a26)
Kernel Version	3.10.49
Local Time	Tue Sep 15 19:51:32 2015
Uptime	1d 17h 34m 1s
Load Average	0.08, 0.44, 0.57

Memory

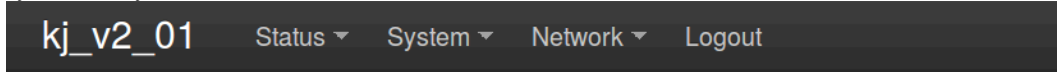
Total Available	<div style="width: 57%;">35440 kB / 61692 kB (57%)</div>
Free	<div style="width: 26%;">16128 kB / 61692 kB (26%)</div>
Cached	<div style="width: 21%;">13504 kB / 61692 kB (21%)</div>
Buffered	<div style="width: 9%;">5808 kB / 61692 kB (9%)</div>

Network

IPv4 WAN Status

Type: dhcp
wlan0 Address: 192.168.42.65
Netmask: 255.255.255.0
Gateway: 192.168.42.1
DNS 1: 192.168.42.1
Connected: 3h 21m 9s

48. Go to System → System



System

Here you can configure the basic aspects of your device like its hostname or the timezone.

System Properties

General Settings

Logging

Language and Style

Local Time Thu Jul 2 00:21:19 2015

Sync with browser

Hostname kj_v2_01

Timezone America/Los Angeles

49. Change Host Name

50. Go to Network → Wifi

51. Click Scan

52. Click Join Network on for the network you want to join



Join Network: Wireless Scan

 100%	Sonic.net-211 Channel: 6 Mode: Master BSSID: B8:E6:25:9B:C0:8A Encryption: WPA2 - PSK	Join Network
 68%	Flux Container Channel: 9 Mode: Master BSSID: 68:72:51:28:EA:63 Encryption: WPA2 - PSK	Join Network
 42%	ATT128 Channel: 1 Mode: Master BSSID: 64:55:B1:83:B3:60 Encryption: mixed WPA/WPA2 - PSK	Join Network
 40%	AmSteelSouth Channel: 1 Mode: Master BSSID: 38:3B:C8:74:CE:C2 Encryption: WPA2 - PSK	Join Network
 35%	AmericanSteelFAST Channel: 11 Mode: Master BSSID: C2:9F:DB:95:BE:90 Encryption: mixed WPA/WPA2 - PSK	Join Network

Back to overview

Repeat scan

53. Click Save and Apply
54. Wireless Network page will appear
55. Network icon will turn blue if it is working

kj_v2_01

[Status](#) [System](#) [Network](#) [Logout](#)
AUTO REFRESH ON

Wireless Network: Client "Sonic.net-211" (wlan0)

The *Device Configuration* section covers physical settings of the radio hardware such as channel, transmit power or antenna selection which are shared among all defined wireless networks (if the radio hardware is multi-SSID capable). Per network settings like encryption or operation mode are grouped in the *Interface Configuration*.

Device Configuration

General Setup
Advanced Settings

Status
Mode: Client | **SSID:** Sonic.net-211
 97% **BSSID:** B8:E6:25:9B:C0:8A | **Encryption:** WPA2 PSK (CCMP)
Channel: 6 (2.437 GHz) | **Tx-Power:** 12 dBm
Signal: -43 dBm | **Noise:** -95 dBm
Bitrate: 58.5 Mbit/s | **Country:** US

Wireless network is enabled Disable

Channel 11 (2.462 GHz) ▼

Transmit Power 30 dBm (1000 mW) ▼
dBm

Interface Configuration

General Setup
Wireless Security

ESSID Sonic.net-211

Mode Client ▼

BSSID B8:E6:25:9B:C0:8A

Network

lan:

wan:

wwan:

create:

Choose the network(s) you want to attach to this wireless interface or fill out the *create* field to define a new network.

Save & Apply
Save
Reset

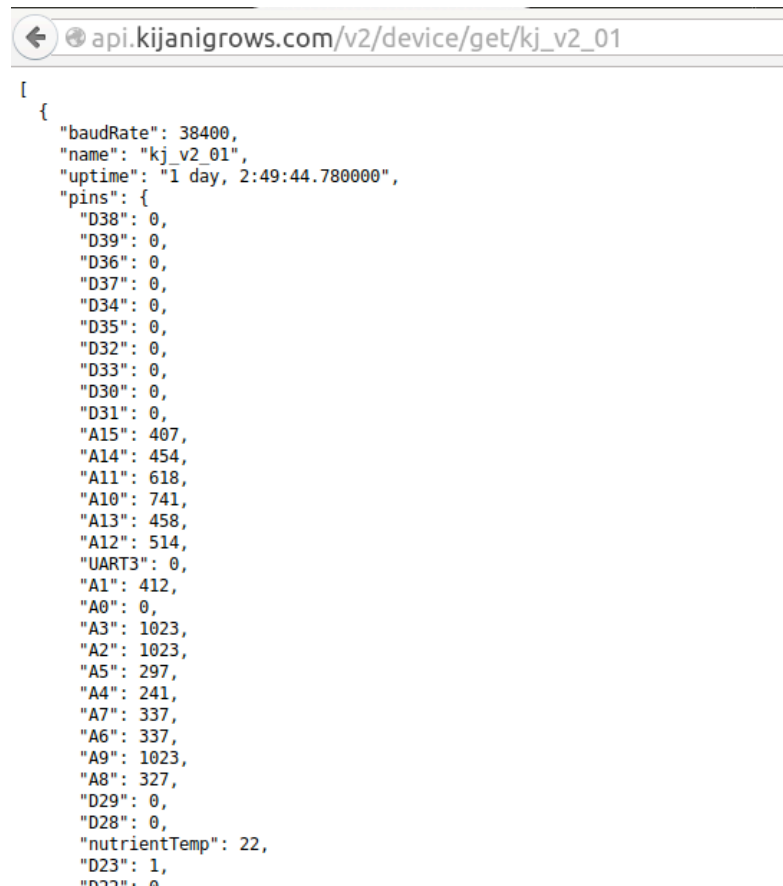
Registering on the Database

56. In a browser navigate to <http://api.kijanigrows.com/v2/devices/list>. You should see your host name in the device list

Gardens	Visualization	Uptime
CCA_GClass	Sat Sep 19 2015 18:54:16 GMT-0700 (PDT)	01:05:54:46
HeartHaus	Sat Sep 19 2015 18:54:18 GMT-0700 (PDT)	01:08:15:33
Salina	Sat Sep 19 2015 18:54:20 GMT-0700 (PDT)	00:02:33:43
ZARDOZ_GROWS	Sat Sep 19 2015 00:16:30 GMT-0700 (PDT)	00:00:13:21
china	Sat Sep 19 2015 18:54:16 GMT-0700 (PDT)	00:11:34:31
ecovillage	Sat Sep 19 2015 18:54:19 GMT-0700 (PDT)	00:02:42:27
kai4	Sat Sep 19 2015 18:54:20 GMT-0700 (PDT)	undefined
kj_v2_01	Sat Sep 19 2015 18:54:17 GMT-0700 (PDT)	01:06:59:02
kj_v2_06	Sat Sep 19 2015 18:54:16 GMT-0700 (PDT)	00:03:26:15
kj_v2_10	Sat Sep 19 2015 18:54:19 GMT-0700 (PDT)	undefined
kj_v2_12	Sat Sep 19 2015 18:54:13 GMT-0700 (PDT)	00:14:18:10
kj_v2_17	Sat Sep 19 2015 18:54:17 GMT-0700 (PDT)	03:04:21:54
kj_v2_18	Sat Sep 19 2015 18:54:17 GMT-0700 (PDT)	10:04:36:22
kj_v2_31	Sat Sep 19 2015 18:54:11 GMT-0700 (PDT)	00:00:58:54

[home](#)

57. In a new tab enter http://api.kijanigrows.com/v2/device/get/<YOUR_HOST_NAME>. You will taken to a webpage that displays the raw JSON string that the database is receiving. Confirm that the data is updating correctly



```
[
  {
    "baudRate": 38400,
    "name": "kj_v2_01",
    "uptime": "1 day, 2:49:44.780000",
    "pins": {
      "D38": 0,
      "D39": 0,
      "D36": 0,
      "D37": 0,
      "D34": 0,
      "D35": 0,
      "D32": 0,
      "D33": 0,
      "D30": 0,
      "D31": 0,
      "A15": 407,
      "A14": 454,
      "A11": 618,
      "A10": 741,
      "A13": 458,
      "A12": 514,
      "UART3": 0,
      "A1": 412,
      "A0": 0,
      "A3": 1023,
      "A2": 1023,
      "A5": 297,
      "A4": 241,
      "A7": 337,
      "A6": 337,
      "A9": 1023,
      "A8": 327,
      "D29": 0,
      "D28": 0,
      "nutrientTemp": 22,
      "D23": 1,
      "D22": 0
    }
  }
]
```

Adding Sensor Mapping

58. Then in a new tab enter http://api.kijanigrows.com/v2/sensors/newDeviceSensor/<YOUR_HOST_NAME>

Name	kj_v2_01
.	
Pin	Sensor
A1	photocell_sensor
A2	leak_sensor
A4	gb_level_sensor
D23	reservior_level_sensor
D6	tank_level_sensor
D8	flow_switch_sensor
flow_rate_sensor	flow_rate_sensor
nutrientTemp	temperature_sensor
A0 :	humidity
<input type="button" value="add sensor mapping"/>	

59. Select the Pin and sensor type from the drop down menu

60. Click the “add sensor mapping” button to add the sensor your have connected

61. Repeat for all sensors connected

Viewing Sensor Readings

62. In a new tab enter http://api.kijanigrows.com/v2/device/sensors/jade/<YOUR_HOST_NAME>. You will see a webpage that display the sensor data converted to the appropriate units

63. To change the set points and conversion factors go back to http://api.kijanigrows.com/v2/sensors/newDeviceSensor/<YOUR_HOST_NAME>

64. In the Sensor column, click on the link for the sensor you want to adjust. You will be take to a new window where you can adjust all the setting for that sensor

Kijani Grows

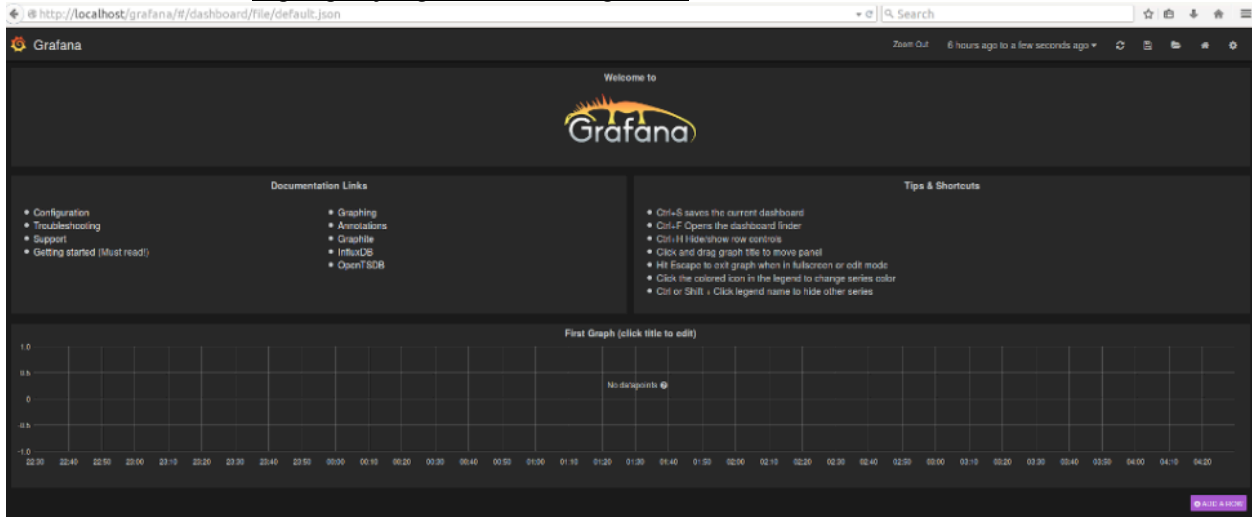
Update

Name	<input type="text" value="pH"/>
Type	<input type="text" value="analogue"/>
Units	<input type="text" value="pH"/>
Key	<input type="text" value="atlasPH"/>
High setpoint	<input type="text" value="8"/>
higher than setpoint message	<input type="text" value="pH is high"/>
Low setpoint	<input type="text" value="2"/>
lower than setpoint message	<input type="text" value="ph is low"/>
Conversion code	<input type="text"/>

[home](#)

Displaying the Data

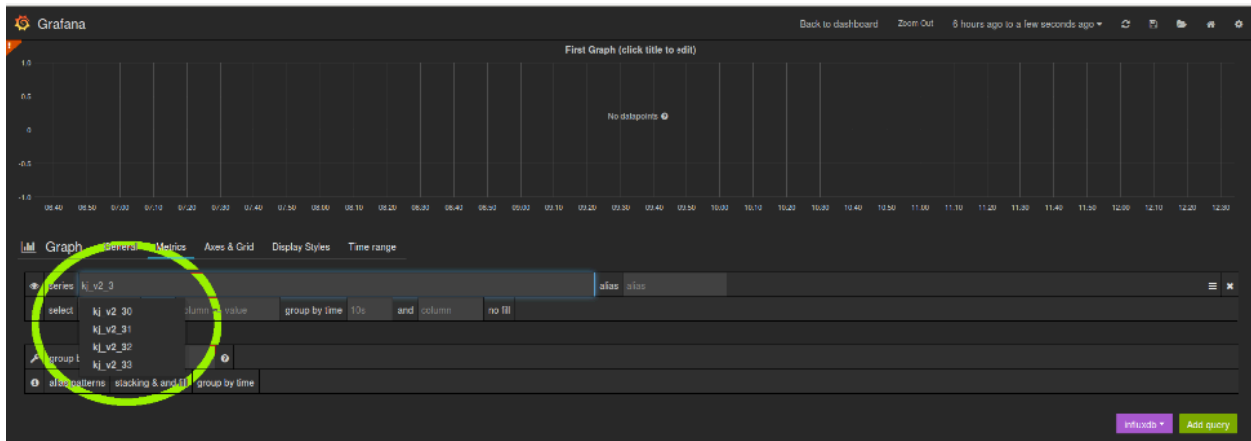
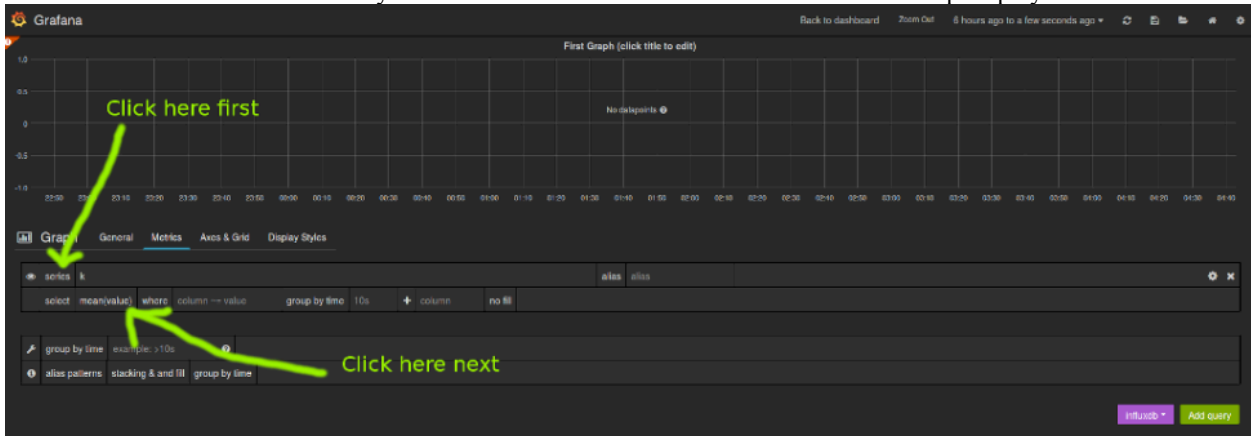
65. In a new tab enter <http://api.kijanigrows.com:8080/grafana>



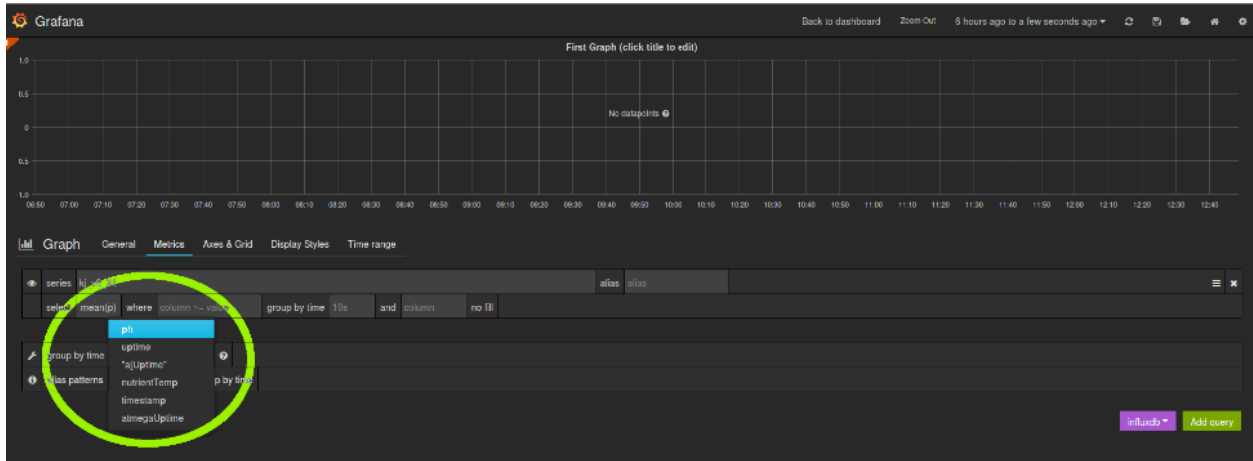
66. Click the title 'First Graph' then click on edit as shown below



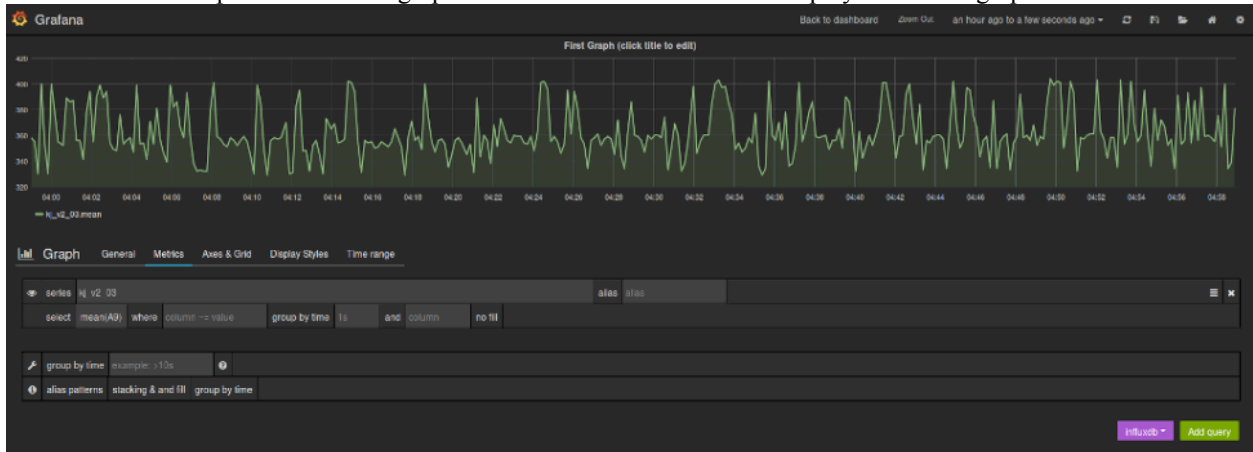
67. Next click on series and enter your controller name. Click on it once the context help displays it.



68. Next click on 'value' and type your sensor pin name 'eg A4' and select it from the dropdown list as shown below. For temperature sensor use (nutrientTemp)



69. You should be presented with a graph. Click 'Back to dashboard' to display the sensor graph as shown below:



70. Next add the rest of the sensors to the graph as shown below

