

How To: BeagleBone with Grove Cape

Description

The BeagleBone is a credit card sized single-board computers that makes use of system on a chip (SoC) technology. This example will focus on a Python example running on the BeagleBone. Additionally, this example will make use of the Grove Cape for BeagleBone interface board.

This “How To” will provide the step-by-step details on how to assemble, configure, and load the BeagleBone 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

BeagleBone’s Python development environment will be used in this example.

Requirements

The following items are requirements for a working LaunchPad IoT:

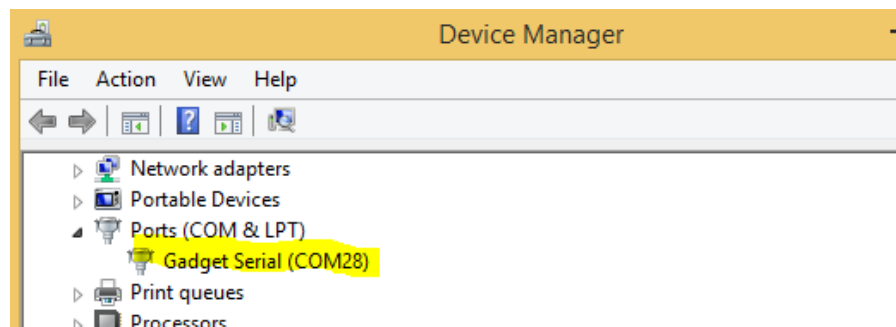
- BeagleBone Black or BeagleBone Green
- BeagleBone Starter Kit from Seeed Studio
- Windows Compatible PC with Internet Access

Setup

Setup for the LaunchPad IoT consist of these steps:

1. Signup for an M2M Account on the Management Portal

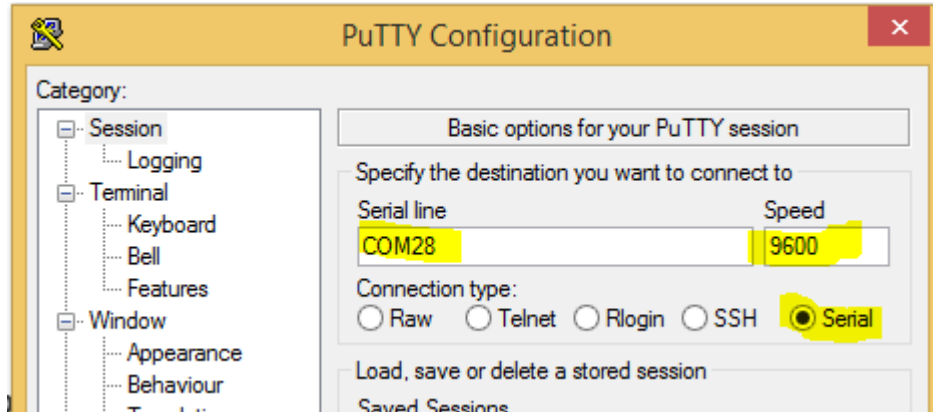
2. Download the getting started file from the Management Portal
3. Create a new “Thing” Definition on the Management Portal
 1. Open the downloaded file and extract the ‘BBThingDef.json’ file to your PC’s desktop
 2. Select ‘Developer’ from the Management Portal
 3. Click on ‘Thing definitions’ and then click the ‘Import’ button
 4. Click the ‘Attach File’ button and select the JSON file copied in the previous step
 5. 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 ‘BeagleBoneApp’
 - In the ‘Description’ field enter ‘BeagleBone App’
 - In the ‘Auto Registration Thing Definition ID’ select ‘BeagleBone 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. Download and install FileZilla from [here](#).
6. Connect the USB power cable from your computer to your BeagleBone and allow it to boot up.
7. Open the Windows “Device Manager” on your computer
8. Find your BeagleBone under “Ports” – it will be listed as “Gadget Serial” and take note of the COM port assigned (COM28 in this specific example)



9. From within the file downloaded in step 2

- Copy all the files into the C:\deviceWISE folder

10. Open a Putty Session to the BeagleBone using the COM port obtained in Step 8. (For this specific example, it's COM Port 28.)



11. Use the following credentials to log in: UserID: debian Password: temppwd

12. Update the BeagleBone to ensure you are running the latest version of all files

- From the Linux command prompt type:
 1. `sudo apt-get update` (enter Yes if prompted)
 2. `sudo apt-get upgrade` (enter Yes if prompted)

13. Connect an Ethernet cable to the Ethernet Port of the BeagleBone

14. From the Linux prompt, issue: "ifconfig" and record the IP Address of your BeagleBone.

15. Install the Paho Python Client for MQTT support

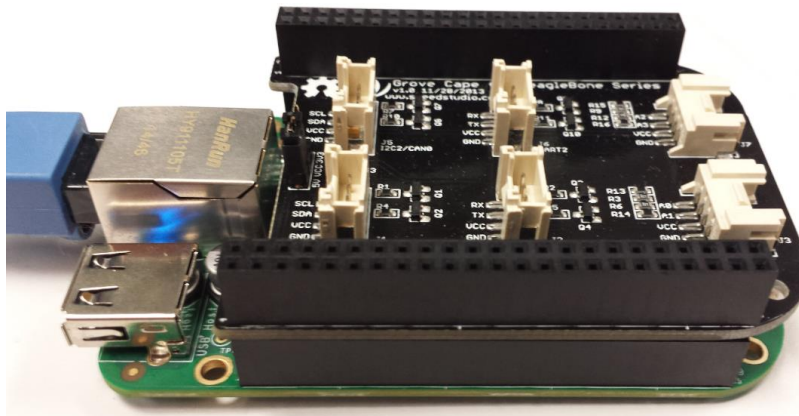
- `mkdir /home/debian/paho`
- `cd /home/debian/paho`
- `sudo git clone http://git.eclipse.org/gitroot/paho/org.eclipse.paho.mqtt.python.git`
- `cd org.eclipse.paho.mqtt.python`
- `sudo python setup.py install`

16. Power down the BeagleBone in order to install the additional hardware

- From the Linux command prompt enter: `sudo shutdown -h now`
- Wait for the system to fully shutdown
- Remove the USB cable from the BeagleBone

17. Setup the Beagle Bone Grove Cape

- Stack the Grove Cape on top of the BeagleBone as shown in the picture below. Ensure that the pins are properly connected as shown in the picture.

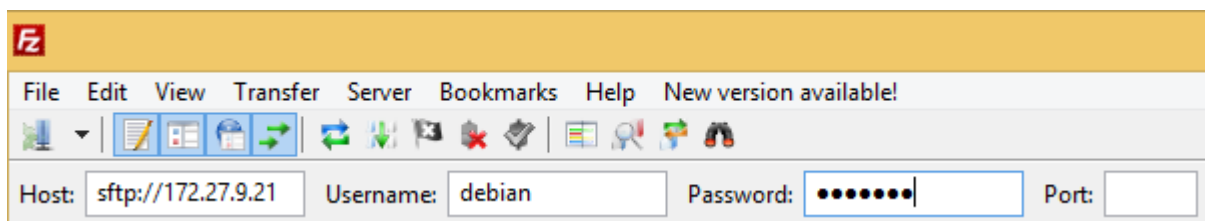


18. Connect the USB power cable to your BeagleBone and allow it to boot up.

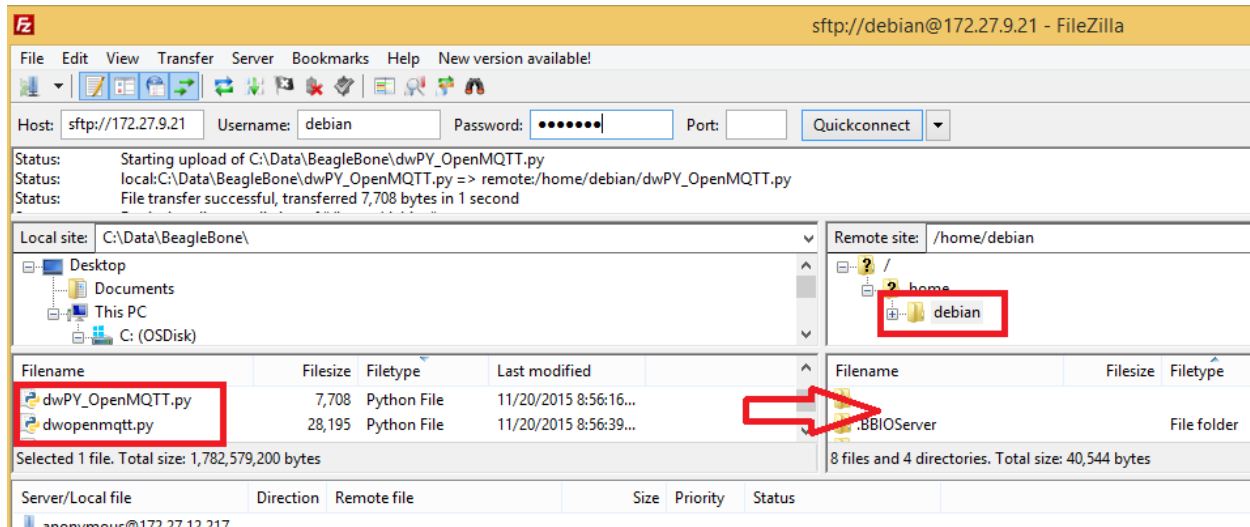
19. Start FileZilla, the file transfer program that was downloaded in the earlier step

20. Enter your BeagleBone details in FileZilla to allow it to connect to the BeagleBone

- In the Host field enter: `sftp://xxx.xx.xx.xx` , where xxx.xx.xx.xx is the IP Address recorded in the earlier step
- In the Username field enter: `debian`
- In the Password field enter: `temppwd`
- Press Enter, this will connect FileZilla to the BeagleBone



21. Using FileZilla, transfer the sample Python source files (from Step 9) to the BeagleBone



22. Using Putty, Log into the BeagleBone using the login credentials mentioned in the earlier steps

23. From the BeagleBone command prompt, enter the following command : nano dwPY_OpenMQTT.py

24. Scroll down the file until you encounter the “dwAppToken” variable

25. Change the “???????” to your unique app token obtain in the first few steps

26. Save and Exit the file

27. The sample program will make use of various sensors and indicators – connect the Grove device to the GrovePi+ board connectors as specified below:

- Grove Rotary Sensor to: J3
- Grove LED Socket to: J2
- Grove Buzzer to: J6

28. From the Linux command prompt, enter the following command :

- sudo python dwPY_OpenMQTT.py

29. The sample program should now start running - review the monitor for its progress

30. Open the “Things” page on the Management Portal to display your device

31. Open your ‘Thing’ device by clicking the ‘view’ icon (the eyeball) next to your device. The Grove Temperature and Grove Rotary sensor data will display accordingly.

32. Use the ‘Methods’ tab to turn ON and OFF LEDs

33. Use the ‘Methods’ tab to sound the buzzer for a defined period of time

