

How To: Raspberry Pi with Arduberry & MultiTech Socket MODEM

Description

The Raspberry Pi is a credit card sized single-board computers that makes use of system on a chip (SoC) technology. This example will focus on the Raspberry Pi running Raspbian – a Linux operating system. Additionally, this example will make use of the Arduberry and MultiTech Socket MODEM boards.

This “How To” will provide the step-by-step details on how to assemble, configure, and load the Raspberry Pi to publish the following data:

- Information Log Messages
- Location Data (Latitude, Longitude, etc)
- Identification Attribute Data
- Temperature Property Data

Software Prototyping Platform

Various Linux gnu software tools will be used throughout the demo to build the final sample program.

Requirements

The following items are requirements for a working LaunchPad IoT:

- Raspberry Pi Generation 2 Model B
- SD Card (8 GB Class 4)
- HDMI Compatible Monitor, USB Keyboard & Mouse, and Ethernet cable
- Arduberry 1.0 Raspberry Pi to Arduino Interface Module
- MultiTech Socket Shield with Cell MODEM
- Two 4 inch wire jumpers with female connectors on both ends
- Windows Compatible PC with Internet Access

Setup

Setup for the LaunchPad IoT consist of these steps:

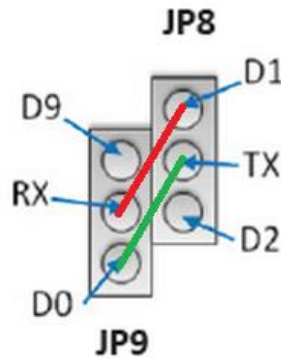
1. Signup for an M2M Account on the Management Portal
2. Download the getting started file from the Management Portal
3. Create a new “Thing” Definition on the Management Portal
 1. Open the downloaded file and extract the ‘DevKitThingDefinition.json’ file to your PC's desktop
 2. Select ‘Developer’ 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 ‘RaspberryPiApp’
 - In the ‘Description’ field enter ‘RaspberryPi App’
 - In the ‘Auto Registration Thing Definition ID’ select ‘DevKit IoT Device’
 - 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. Download and install the Win32DiskImager from Source forge using this [link](#).
7. From within the file downloaded in step 2
 - Copy all the files into the C:\deviceWISE folder
8. Download the Raspbian Operating System from [here](#) to your Windows computer
9. Unzip the .img file within the downloaded Raspbian file
10. Insert your SD card into your Windows PC using a card reader.
11. Open Win32DiskImager.exe, the application you just downloaded, by double-clicking on it. If you're running Windows 7 or 8, right click on it and choose "Run as Administrator" instead.

12. If your SD card isn't automatically detected by the application, click on the drop-down menu at the top right (labeled "Device") and choose it from the list.
13. In the image file section of the application, click the little folder icon and choose the Raspbian .img file you just downloaded and unzipped.
14. Click the Write button and wait for Win32DiskImager to complete. When it finishes, you can safely eject your SD card
15. Insert the SD card into your Raspberry Pi
16. Connect your USB Keyboard and Mouse into the Raspberry Pi's USB ports
17. Connect your active Ethernet cable into the Raspberry Pi's Ethernet port
18. Connect your Monitor's HDMI cable into the HDMI port on the Raspberry Pi

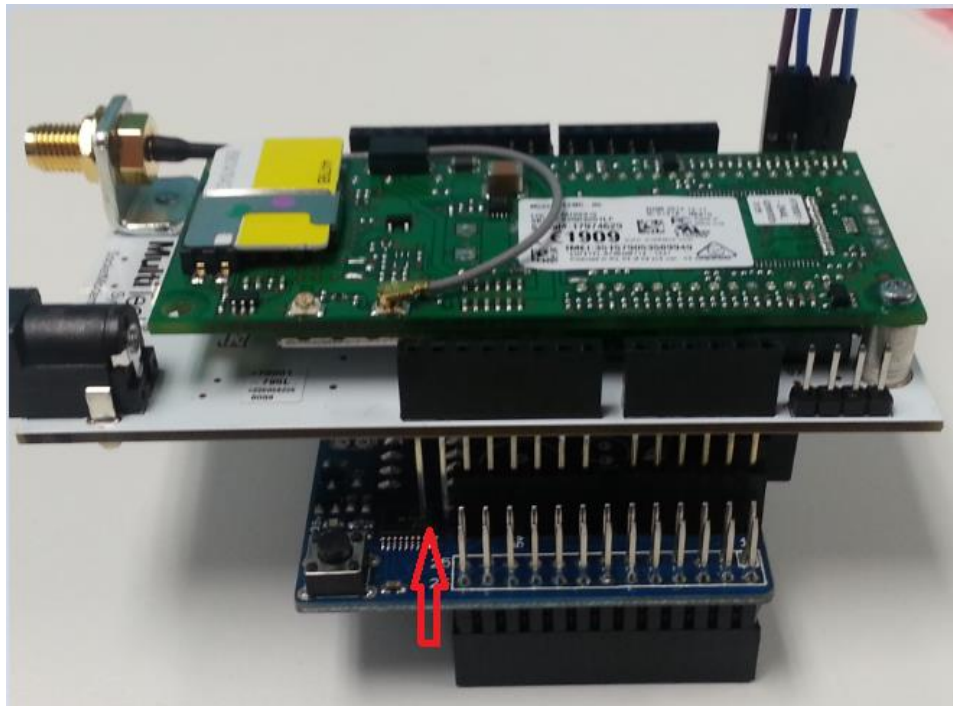


19. Connect the USB power cable to your Raspberry Pi and allow it to boot up (Check its progress on the HDMI monitor.)
20. When the Raspi-config window is displayed, do the following:
 1. Select expand_rootfs (the second option) and press enter.
 2. Confirm that you want to expand the file system and let Raspbian do its thing.
 3. When you're returned to the configuration list, go all the way to the bottom and select the Finish option.
 4. It'll ask you if you want to reboot. Choose yes.
 5. When the Raspberry Pi reboots, use the following credentials to log in: UserID: pi
Password: raspberry

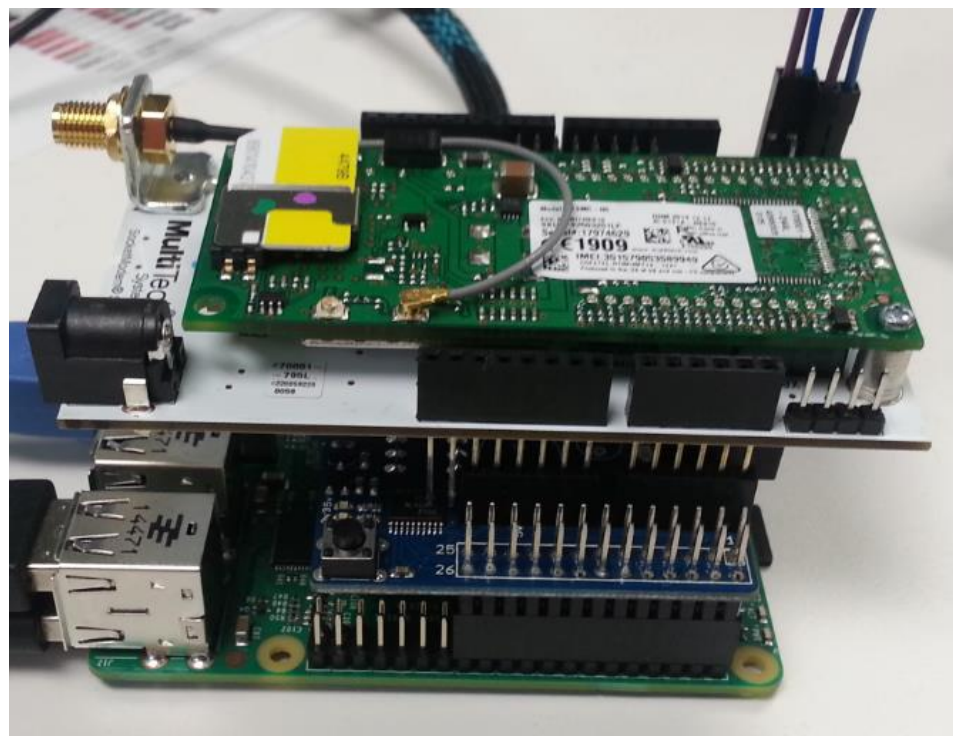
21. Update the Raspbian OS to ensure you are running the latest version of all files
- From the Linux command prompt type: `sudo apt-get update` (enter Yes if prompted)
 - From the Linux command prompt type : `sudo apt-get upgrade` (enter Yes if prompted)
22. Power down the Raspberry Pi in order to install the additional hardware
- From the Linux command prompt enter: `sudo shutdown -h now`
 - Wait for the system to fully shutdown
 - Remove the USB Power cable from the Raspberry Pi
23. Setup the MultiTech Socket MODEM card
- Remove all the JP10 Jumpers
 - Remove both JP8 and JP9 Jumpers
 - Connect the two 4 inch wire jumpers between JP8 and JP9 as depicted by the Red and Green lines below



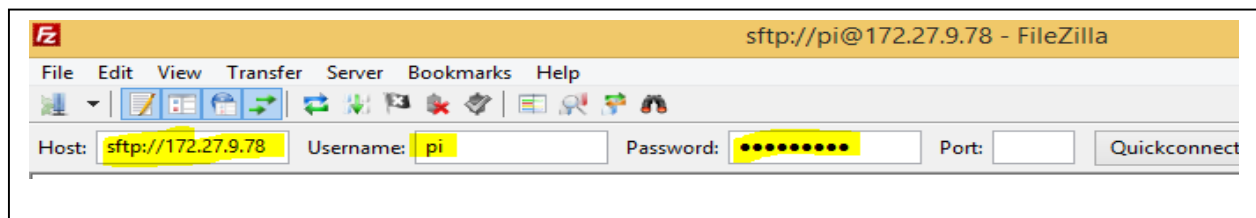
24. Mount the MultiTech Socket MODEM onto the ArduBerry board as shown below (Note when properly installed two Socket Modem pins extend beyond the header connector on the ArduBerry.)



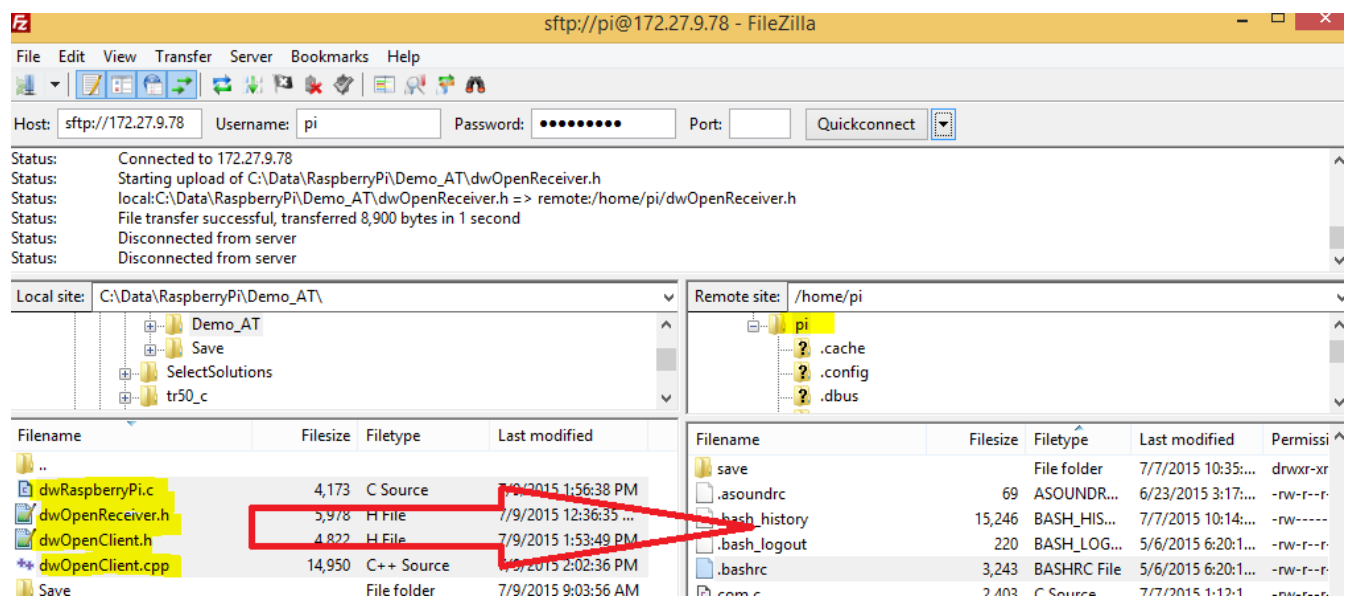
25. Mount the ArduBerry board onto the Raspberry Pi as shown below



26. Connect the Antenna to the MultiTech Socket Modem
27. Connect the USB power cable to your Raspberry Pi and allow it to boot up
28. Record the IP Address of your Raspberry Pi – this is displayed as “My IP Address is xxx.xx.xx.xx” on the HDMI monitor when boot up is completed.
29. Start FileZilla, the file transfer program that was downloaded in the earlier step
30. Enter your Raspberry Pi details in FileZilla to allow it to connect to the Raspberry Pi
 - 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: pi
 - In the Password field enter: raspberry
 - Press Enter, this will connect FileZilla to the Raspberry Pi



31. Using FileZilla, transfer the sample source files (from Step 7) to the Raspberry Pi



32. Log into the Raspberry Pi using the login credentials mentioned in the earlier steps

33. From the Raspberry Pi command prompt, enter the following command : nano
dwRaspberry.c
34. Scroll down the file until you encounter the “#define DWOPEN_APPTOKEN” label
35. Change the “???????” to your unique app token obtain in the first few steps
36. Save and Exit the file
37. From the Raspberry Pi command prompt, enter the following command :
 - g++ -lpthread dwRaspberryPi.c dwOpenClient.cpp -o RaspberryPi
38. From the Raspberry Pi command prompt, enter the following command :
 - dwRaspberryPi /dev/ttyAMA0
39. The sample program should now start running - review the monitor for its progress
40. Open the “Things” page on the Management Portal to display your device
41. 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.
42. Use the ‘Methods’ tab to simulate turning ON and OFF LEDs (Note: LED simulation is only via message on the terminal emulator as no additional LEDs where installed on the unit.)