



Z-Stack Linux Gateway Quick Start Guide

Version 1.0

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1. Install the SDK Package

File Name: Z-Stack_Linux_Gateway-1.0.1-linux-installer

This is a self-extracting archive file, to be run on an x86 Linux machine. Once executed, following acceptance of the license agreement, it extracts the following content into the specified <INSTALL> directory:

Default <INSTALL> directory, when you execute the self-extracting installer, is set to:

Z-Stack_Linux_Gateway-1.0.1.

BeagleBone Z-Stack Linux Gateway Binaries: <INSTALL>/Precompiled_arm

Sample App Source code: <INSTALL>/Source

Firmware: <INSTALL>/Firmware

Proto Files: Firmware: <INSTALL>/Proto_files

Documents: <INSTALL>/Documents

2. BeagleBone Setup

- Install the latest Beaglebone Black Debian software image. Instructions (follow ALL steps):

<http://beagleboard.org/Getting%20Started>

Beaglebone Black Debian Image is available for both SD card and eMMC:

<http://beagleboard.org/latest-images>

Note: Use micro SD 2GB or larger

SD card Image: Select the Debian image link under the section “*BeagleBone (Runs on BeagleBone Black as well without flashing the eMMC)*”

eMMC Image: Select the Debian image link under the section “BeagleBone Black (eMMC flasher)”.

“Getting Started” link has details on how to program SD or eMMC image on Beaglebone Black.

- After Beaglebone setup is complete, connect the board to Host PC using mini USB cable. Host PC should have network-over-USB access to the Beaglebone board. IP address of the BeagleBone Black over this network interface is 192.168.7.2.

- Windows Host PC

After BeagleBone boots, new Ethernet interface is created on Host PC with the name “Linux USB Ethernet/RNDIS Gadget”. PC Local IP address 192.168.7.1 should get assigned to the new network interface. In case not, assign static IP address 192.168.7.1 and netmask 255.255.255.0 to the new network interface.

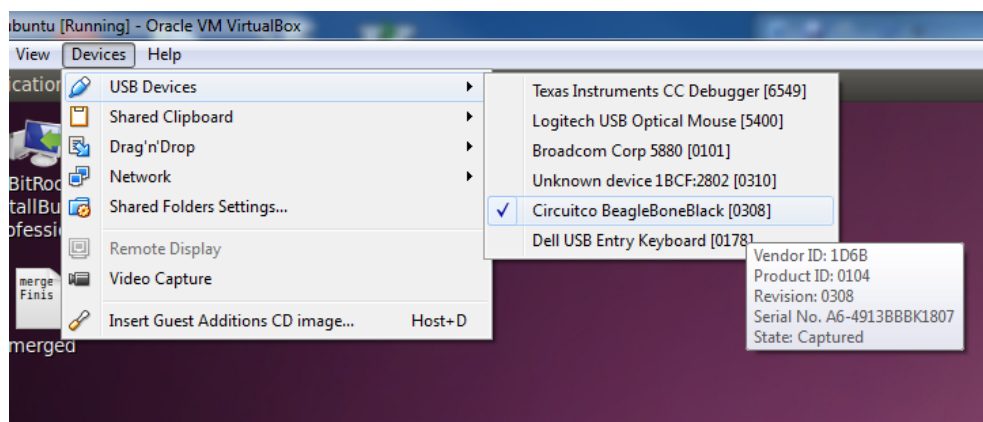
- Linux Host PC

PC local IP address 192.168.7.1 should get automatically assigned to the new network interface (network over USB).

For VirtualBox (or similar) hosted Linux Host OS's, make sure the guest Linux OS has access to the BeagleBone over the USB interface. In the VirtualBox menus, select

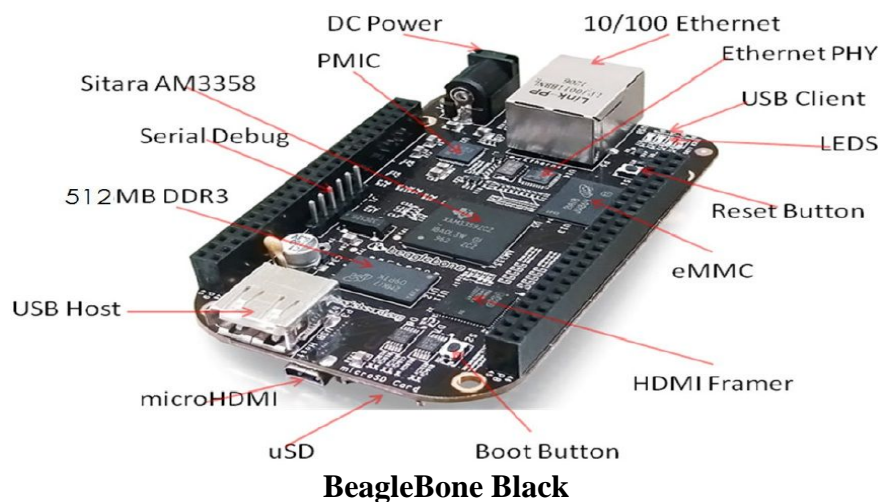
Devices->USB Devices->CircuitCo BeagleboneBlack

as shown below:



- Beaglebone Login credentials:

user: root
password:



- Insert TI CC2531 USB dongle in Beaglebone USB Host slot. In case dongle is not pre-flashed with correct image, use CC Debugger to flash Firmware/CC2531-GW-ZNP_<revision>.hex.

Note: the flash-able firmware image can be found in <INSTALL>/Firmware

- Install Z-Stack Linux Gateway binaries on Beaglebone

The installed package comes with pre-built Z-Stack Linux Gateway binaries for Beaglebone. Using 'scp' or similar protocol, transfer binaries to Beaglebone:

```
$ cd <INSTALL>/Precompiled_arm
$ scp z-stack_linux_gateway_arm_binaries_<version>.tar root@192.168.7.2:/root
```

Note: If you get an error when you attempt to transfer additional files to the Beaglebone:

"No space left on device"

Please follow the instructions at this link to grow the root file system partition:

http://elinux.org/Beagleboard:BeagleBoneBlack_Debian#Expanding_File_System_Partition_On_A_microSD

3. Running Z-Stack Linux Gateway on Beaglebone

- Open 2 SSH client shells on your host PC

Note: you can use whatever preferred terminal application you chose. eg. Gnome Terminal for Linux, Putty for Windows, etc.

Connect to port 22 and login as user *root*

- Untar Z-Stack Linux Gateway Binaries

```
$ cd ~
$ mkdir z-stack_linux_gateway_arm_binaries
$ tar xvf z-stack_linux_gateway_arm_binaries_<version>.tar -C z-stack_linux_gateway_arm_binaries
```

- On one shell, run following commands to start Z-Stack Linux Gateway servers

```
$ cd ~/z-stack_linux_gateway_arm_binaries
$ cp protobuf/libprotobuf-c.so.0 /usr/lib/
$ cd servers
$ chmod +x ./zigbeeHAgw
$ ./zigbeeHAgw beaglebone
```

This script will start and monitor following servers:

- NPI_Inx_arm_server
 - ZLSZNP_arm
 - NWKMGR_SRVR_arm
 - GATEWAY_SRVR_arm
 - OTA_SRVR_arm
- On the second shell, run following commands to start Z-Stack Linux Gateway application

```
$ cd ~/z-stack_linux_gateway_arm_binaries/servers
$ chmod +x ./start_application
$ ./start_application
```

- Stopping Gateway Servers

Aborting the script “zigbeeHAgw” (Ctrl + C) will kill all the Gateway servers

- Stopping Gateway Application

Use “Quit”/”q” to quit the sample application

4. Z-Stack Linux Gateway Sample Application Commands

For more details on the features of the sample application, please refer to “Z-Stack Linux Gateway User Guide”. You can also find more BeagleBone specific details in “Z-Stack Linux Gateway User Guide BeagleBone Addendum”.

5. Troubleshooting / Frequently Asked Questions

- I'm installing/updating my Beaglebone to the latest Debian image, which image should I download?

SD card Image: Select the Debian image link under the section “*BeagleBone (Runs on BeagleBone Black as well without flashing the eMMC)*”

eMMC Image: Select the Debian image link under the section “BeagleBone Black (eMMC flasher)”.

Consult section 2 “BeagleBone Setup” for more details

- Writing the new Debian image with the Ubuntu tool recommended by Beagleboard.org doesn't seem to finish?

It is recommend to use the Windows SDCard writing tool if possible.

- When writing the Debian image to the SDCard, the MD5 generated by the Windows SDCard writing tool does not match the MD5 string displayed on the Beagleboard website.

This discrepancy can be ignored.

- I need to (re)flash the CC2531. What is a CC-Debugger?

Please visit the following link for more information regarding the CC-Debugger:

<http://www.ti.com/tool/cc-debugger>

- No space left on device?

If you get an error when trying to copy files to the BeagleBone indicating that there's no space left on the device, this is due to the fact that the process to write the new Debian image to the SD Card does not resize the partition on the SD Card to take full advantage of any surplus space.

You can confirm this by entering the following command, while logged into the Beaglebone:

```
$ df -h
```

If the output of the above command indicates no free space on the root device, please follow the instructions at this link to grow the root file system partition:

http://elinux.org/Beagleboard:BeagleBoneBlack_Debian#Expanding_File_System_Partition_On_A_microSD

- Tar is complaining about the timestamp of the .tar file being in the future?

This indicates that the date and time on the BeagleBone are not set. You have two options to deal with this:

1. Set the date and time manually:

```
$ date -s "2014-MM-DD HHMM"
```

Note: Substitute the numbers for MM (month, ie. April = 04), DD (day of the month), and HHMM (hours and minutes).

2. Setup ntp (network time protocol client). Configuring ntp is outside the scope of this guide. Please consult your favorite Debian and/or BeagleBone Black web sites for more help with this.