**Beaglebone Black (BBB)**

**Note that the Sections presented below are a step-guide that should be followed in order**

**For this tutorial, you will need:**

* miniHDMI – HDMI cable
* HD Monitor
* microSD card (8GB or higher)
* microSD adapter
* Ethernet cable
* HUB (Router) with Ethernet port 🡪 Internet Connection
* All-in-one Bluetooth keyboard/mouse
* **Update latest Debian Image**
* Get a microSD card (8GB or higher) and an adapter to plug it into your Computer’s SD card reader slot
* Download Etcher
  + [**https://etcher.io**](https://etcher.io)
* Download the latest image (Either IoT or LXQT, based on your needs)
  + [**http://debian.beagleboard.org/images/bone-debian-9.3-iot-armhf-2018-01-28-4gb.img.xz**](http://debian.beagleboard.org/images/bone-debian-9.3-iot-armhf-2018-01-28-4gb.img.xz)
  + [**http://debian.beagleboard.org/images/bone-debian-9.3-lxqt-armhf-2018-01-28-4gb.img.xz**](http://debian.beagleboard.org/images/bone-debian-9.3-lxqt-armhf-2018-01-28-4gb.img.xz)
* Unzip the downloaded image
* Insert SD card in your Computer’s SD card slot
* Use Etcher to write the image to your SD card. Etcher will transparently decompress the image on-the-fly before writing it to the SD card
  + Etcher should automatically detect your SD card
  + Make sure you select the right unzipped image
* Eject the newly programmed microSD card once the writing process has ended
* Introduce the microSD card into your BBB
  + Make sure the card is fully seated
* Connect your Beaglebone Black (BBB) to your local network using the BBB’s RJ-45 Ethernet port
  + Just plug the Ethernet cable right in
* Establish the connection between your BBB and your monitor through your HDMI cable
  + Simply hook your HDMI cord to the correct ports
  + Make sure you **do not turn on** your BBB yet
* Connect all-in-one Bluetooth USB to your BBB
* **Press/hold the USER/BOOT button**
* **Keep it pushed/held and plug in the USB cable into your computer**
* **Keep it pushed/held until the LEDs next to the Ethernet port light up in a column pattern for a second**
  + **It should take about 10 seconds for the LEDs to light up**
* **Release the USER/BOOT button**
* Wait for the LEDs to display a heart-beat pattern
  + First and Third LEDs should follow this repetitive pattern
* Make sure you can see the BBB’s desktop on your monitor’s screen
* Your BBB has been properly booted from your microSD card with the latest Debian image!
* **Enable SSH root login**
* Open your BBB’s terminal (command line) window
* Type the following command
  + **sudo passwd rootç**
* You will be prompted to enter a new password (**If it comes with a preconfigured password it should be: temppwd, use that one if asked to enter “password for debian”**
  + Type your new root’s password and make sure you do not forget it (**gutlabbb**)
  + Press the enter button
  + Verify the new password by entering it again and press the enter button again
* Type the following
  + **sudo nano /etc/ssh/sshd\_config**
* You will be prompted to enter your root password
  + Type your newly created root’s password
  + Press the enter button
* A txt file will be opened within the terminal and you will need to change the following line
  + FROM: **PermitRootLogin without-password**
  + TO: **PermitRootLogin yes**
* Once you have made the changes, proceed to save and close the file
  + Press **control + x**, then **y**, and **enter**
* Type the following
  + **/etc/init.d/ssh**
* SSH root login has been enabled!
  + From this point it is up to you to keep using a monitor as now you are able to ssh into your BBB from your computer (as long as both are connected to the same Local Network)
* **SSH Login**
* You should be already connected to the Internet by now
  + Assuming you followed the previous steps for the “Update latest Debian Image” procedure
* Find the BBB’s IP address (Follow one of the next two steps)
  + Download **Fing** on your smartphone (AppStore/AndroidMarket) and look for a device named beaglebone
  + Use a browser to access your home hub’s ‘server’ and look for the your BBB’s IP address among the connected devices
* Secure Shell into your BBB to confirm it is connected via Ethernet
  + Open a terminal window and type **ssh root@YOUR\_IP\_ADDRESS**
  + You will be prompted to enter your root password (the one you created in the previous section)
* You are done with this section!
* **Update Date (North America, Eastern Time)**
* Make sure your SSH connection is good still
* Type the following commands in order and wait for each process to complete
  + **apt-get update**
  + **apt-get upgrade**
  + **apt-get dist-upgrade**
  + **apt-get install ntp**
  + **nano /etc/ntp.conf**
  + Proceed to copy and paste the following lines highlighted in red on your terminal window (make sure this part of your file looks exactly like it does below)

# /etc/ntp.conf, configuration for ntpd; see ntp.conf(5) for help

driftfile /var/lib/ntp/ntp.drift

# Enable this if you want statistics to be logged.

#statsdir /var/log/ntpstats/

statistics loopstats peerstats clockstats

filegen loopstats file loopstats type day enable

filegen peerstats file peerstats type day enable

filegen clockstats file clockstats type day enable

# NTP Servers for North America from www.pool.ntp.org

server 0.north-america.pool.ntp.org

server 1.north-america.pool.ntp.org

server 2.north-america.pool.ntp.org

server 3.north-america.pool.ntp.org

# pool.ntp.org maps to about 1000 low-stratum NTP servers. Your server will

# pick a different set every time it starts up. Please consider joining the

# pool: <http://www.pool.ntp.org/join.html>

pool 0.debian.pool.ntp.org iburst

pool 1.debian.pool.ntp.org iburst

* Press **control + x**, then **y**, and **enter**
* **cd /etc**
* **rm localtime**
* **ln -s /usr/share/zoneinfo/America/New\_York /etc/localtime 🡪 Note the space between “York” and “/”**
* **systemctl restart ntp**
* **systemctl enable ntp** (This command should produce an error)
* **apt-get install ntpdate**
* **date** (This command should display the correct Date and Time on the Terminal Window)
* The following links may provide useful information and guidance if you get stuck throughout the date update process
  + [**http://derekmolloy.ie/automatically-setting-the-beaglebone-black-time-using-ntp/**](http://derekmolloy.ie/automatically-setting-the-beaglebone-black-time-using-ntp/)
  + [**http://www.pool.ntp.org/zone/north-america**](http://www.pool.ntp.org/zone/north-america)
  + [**https://linuxconfig.org/how-to-setup-ntp-server-and-client-on-debian-9-stretch-linux**](https://linuxconfig.org/how-to-setup-ntp-server-and-client-on-debian-9-stretch-linux)
* **Setup VNC server on BBB Debian OS**
* Assuming your SSH connection is good still, type the following commands in order and wait for each process to complete
  + **apt-get update**
  + **apt-get upgrade**
  + **apt-get dist-upgrade**
  + **apt-get install x11vnc**
* Start the VNC server in your BBB by typing
  + **x11vnc -auth /var/run/lightdm/root/:0 -forever**
* This will start a VNC server at port 5900
  + **Note this server setup is temporary**
  + **If you want to remotely connect to your BBB after a reboot type the above command again**
* There are quite a few software options in the market to establish a VNC connection with your BBB
  + **VNC Viewer** is my personal favorite
  + **Vinagre** is another option
* **The link below provides further information on the setup of a VNC server**
  + [**http://eionix.blogspot.com/2015/02/remote-access-your-beaglebone-black.html**](http://eionix.blogspot.com/2015/02/remote-access-your-beaglebone-black.html)
* **NPM update**
* Assuming your SSH connection is good still, type the following command
  + **npm -v 🡪 This should display the current version of your installed npm**
  + **npm install -g npm@latest 🡪 This process may take a while**
  + **npm -v 🡪 Check your current npm version. Note how now is 5.6.0 (at time of this manual was written, it could be later update now)**
* You have successfully installed the latest version of npm!
* The link below provides further information on npm updates
  + [**https://docs.npmjs.com/troubleshooting/try-the-latest-stable-version-of-npm**](https://docs.npmjs.com/troubleshooting/try-the-latest-stable-version-of-npm)
* **Node update**
* Assuming your SSH connection is good still, type the following command
  + **curl -sL** [**https://deb.nodesource.com/setup\_8.x**](https://deb.nodesource.com/setup_8.x) **| sudo -E bash -**
  + **sudo apt-get install -y nodejs**
  + **sudo apt-get install -y build-essential**
* You have successfully installed the latest version of Node!
* The link below provides further information on npm updates
  + [**https://nodejs.org/en/download/package-manager/**](https://nodejs.org/en/download/package-manager/)