How to Run MagicMirror ^{2} on the BeagleBone Black

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Overview:

1. Expand the memory of board

The beaglebone black only comes with 4GB of onboard memory, which is not enough to hold all of the libraries and data needed for the mirror software. There is even less of this memory available to us because of pre-installed systems and the operating system! Therefore, our first step is to expand the memory of the beaglebone. This can be done pretty easily using a microSD card as an external storage source, but there are many limitations in using this method such as read + write access issues and file access delays. Instead, we will install the operating system directly on a larger (preferably 16GB) microSD card and make the beaglebone automatically boot from this.

Firstly we will install the beaglebone debian image on a freshly formatted SD card, following Dr. Fraser's reflash guide. Once the SD card is set up, again following the reflash guide, boot the beaglebone holding the USER button with the SD card inserted.

Once it is booted, you may SSH into the board and start by making yourself a superuser using (without $ or #):

```
$ sudo -i
```

Or change to the root user using:

```
$ sudo su
```

Then examine the detected disks and their partitions using:

```
# ls /dev/mmcblk*
```

Any directories with the name `mmcblk1*` belong to the onboard eMMC and should not be altered. The directories prefixed with `mmcblk0*` are the microSD card.

From here we can use the fdisk program to examine and alter the partitions in the microSD card:

```
# fdisk /dev/mmcblk0
```

And press **‘p’** to print the information. The only information to note from this page is the start value of the partition that already exists (if applicable). Then, press **‘d’** to delete the current partition, and **‘n’** to make a new partition. All of the setup questions you may just hit enter to select the default values except the start sector, where you will enter the previously noted start value.

We are almost done with this step, check you partitioned correctly by pressing **‘p’** again and if it looks correct, type **‘w’** to write the changes to the disk.

Now you can reboot the system using:

```
# reboot
```

And once it starts up again, and you SSH into the board again, enter the following:

```
$ sudo su
# fsck /dev/mmcblk0p1
# resize2fs /dev/mmcblk0p1
```

To ensure its been done correctly, check your disk space using:

```
$ df -h
```

2. Setup connections

To use the HDMI output on the beaglebone black, the board must be powered through the 5V plug-in adapter included, and not just through USB.

3. Install a graphical user interface

Now, either through SSH or the display and accompanying peripherals plugged directly into the board, install a GUI. A well recommended, light weight, and simple, desktop is LXDE (Lightweight X11 Desktop Environment). Install it on the board using:

```
$ sudo apt-get update
$ sudo apt-get install LXDE LXDE-CORE LXDE-ICON-Theme
```

4. Clone the MagicMirror^2 repository

Once the GUI is correctly set up on the beaglebone, and you can interact with it using the monitor and peripherals, ensure Node.js is installed using:

```
$ curl -sL https://deb.nodesource.com/setup_16.x | sudo -E bash -
$ sudo apt-get install -y nodejs
```

Then, inside your home directory, clone the MagicMirror^2 github repository using:

```
$ git clone https://github.com/MichMich/MagicMirror
```

Once it is cloned, enter the directory and check it installed correctly, and make a copy of the config file.

```
$ cd MagicMirror/
$ cp config/config.js.sample config/config.js
```

5. Install using open-source scripts

Now, back in your home directory, clone and run the following:

```
$ git clone https://github.com/sdetweil/MagicMirror_scripts
```

```
$ cd MagicMirror_scripts/
$ sudo ./raspberry.sh
```

6. Run the MagicMirror ^{2} software

Once the installation finishes, to run the software (must be using peripherals and the display) run:

```
$ cd ~/MagicMirror
$ ./run-start.sh
```

OR

```
$ cd ~/MagicMirror
$ npm run start
```

References

- Reflash guide
https://opencoursehub.cs.sfu.ca/bfraser/grav-cms/ensc351/guides/files/reflash_bbg

- Space expansion on the BeagleBone platform:
https://elinux.org/Beagleboard:Expanding_File_System_Partition_On_A_microSD

- MagicMirror ^{2} Builders documentation
https://docs.magicmirror.builders/