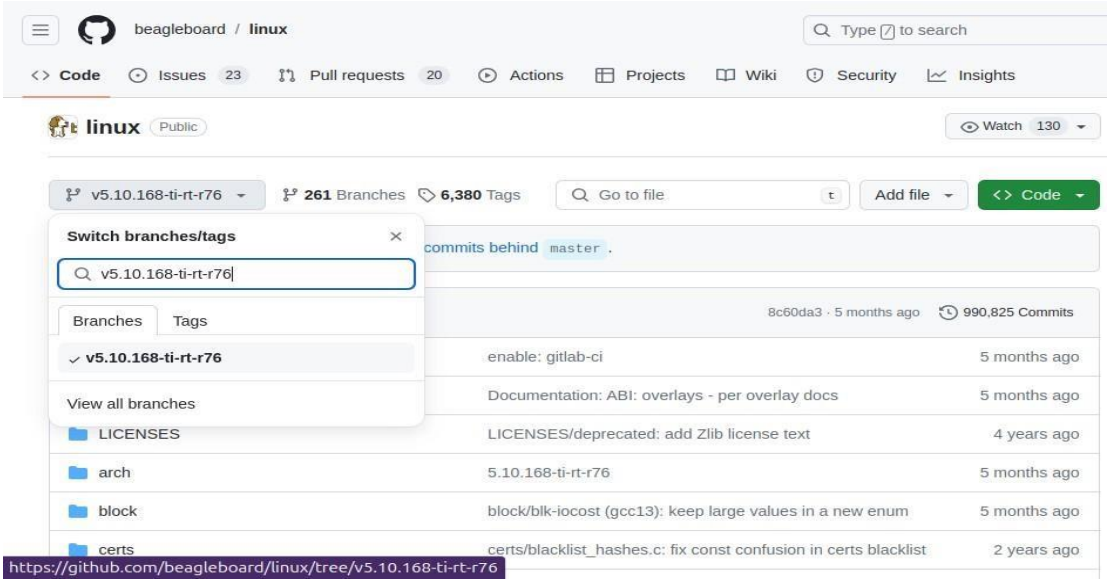
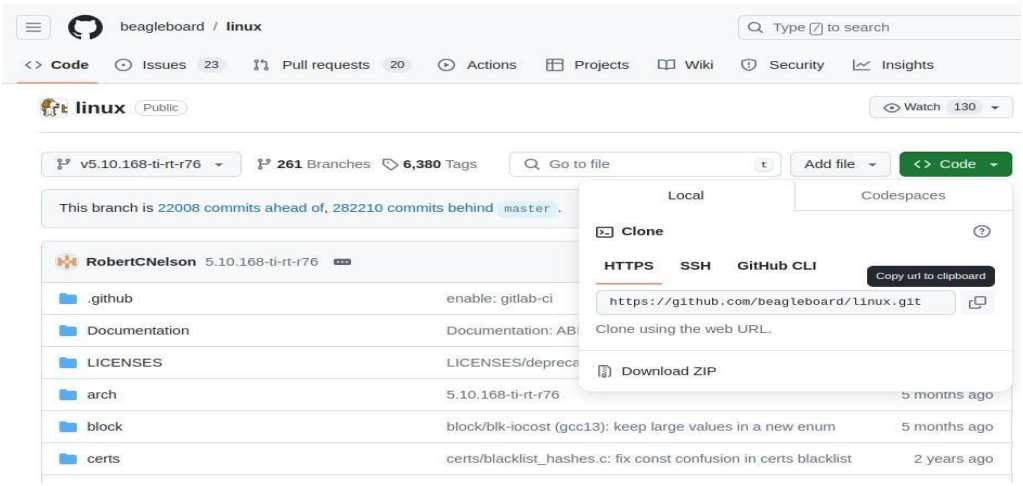
Updating latest Kernel image v5.10.168-ti-rt-r76.

Step 1: Selecting Latest Kernel Source.

- Go to the Beagle Board GitHub repository located at https://github.com/beagleboard/linux.
- Switch to the branch **5.10.168-ti-rt-r76**.



- Copy the link in the code option.

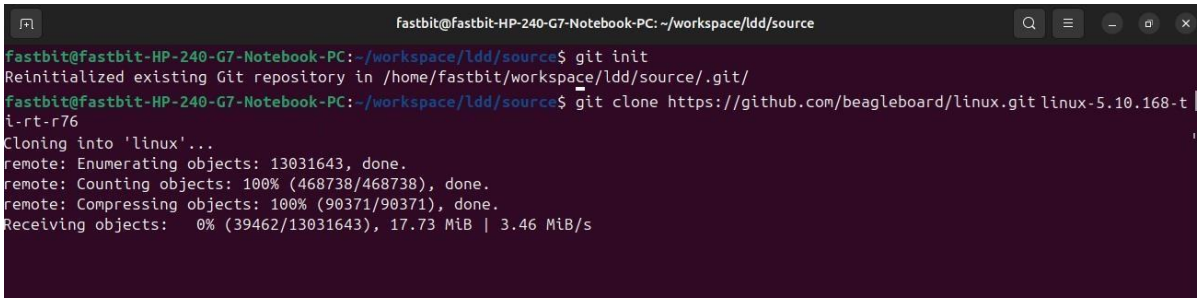


Step 2: Clone the kernel:

- Open the terminal and navigate to the source folder of your workspace. Once you are in the desired directory, run the command.
  git init

- After initializing the Git repository, you can proceed to clone the repository by pasting the copied URL from Git and providing a name for the cloned repository. Here is the command:
- **git clone https://github.com/beagleboard/linux.git**

- Execute the command "**git checkout 5.10.168-ti-rt-r76"** to switch to the desired branch in the Git repository.



Step 3: Kernel Compilation steps.

Set up the host using these commands below.

a. **sudo apt-get update**

b. **sudo apt-get install build-essential lzop u-boot-tools net-tools bison flex libssl-dev libncurses5-dev libncursesw5-dev unzip chrpath xz-utils minicom wget git-core**

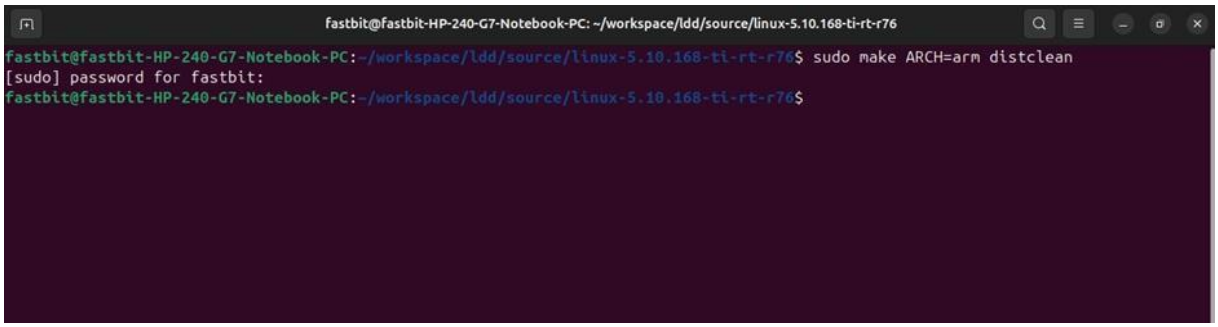
c. **sudo apt-get install-y libgmp-dev**

d. **sudo apt-get install libmpc-dev**

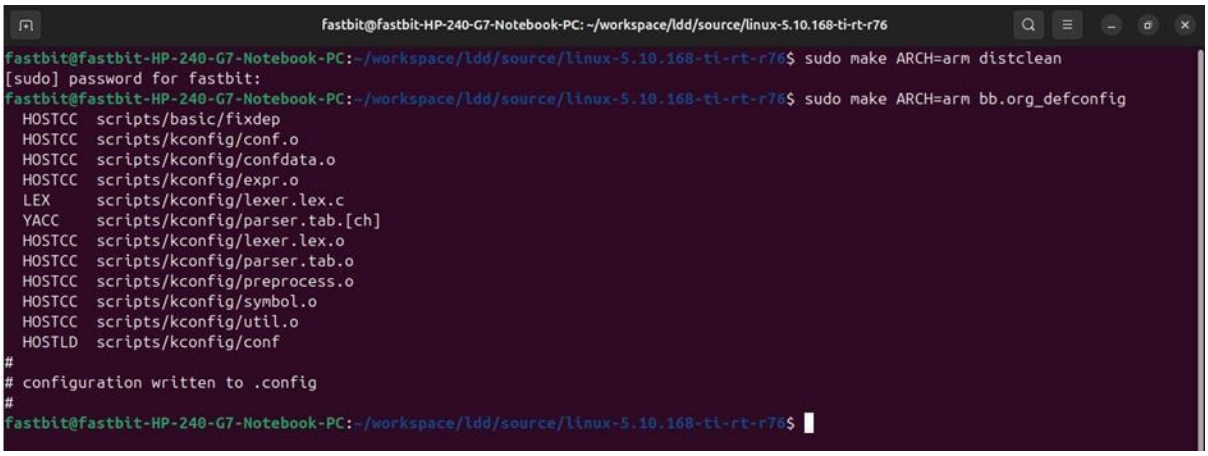
e. **sudo apt-get install liblz4-tool**

1. Removes all the temporary folder, object files, images generated during the previous build. This step also deletes the .config file if created previously.

   make ARCH=arm distclean



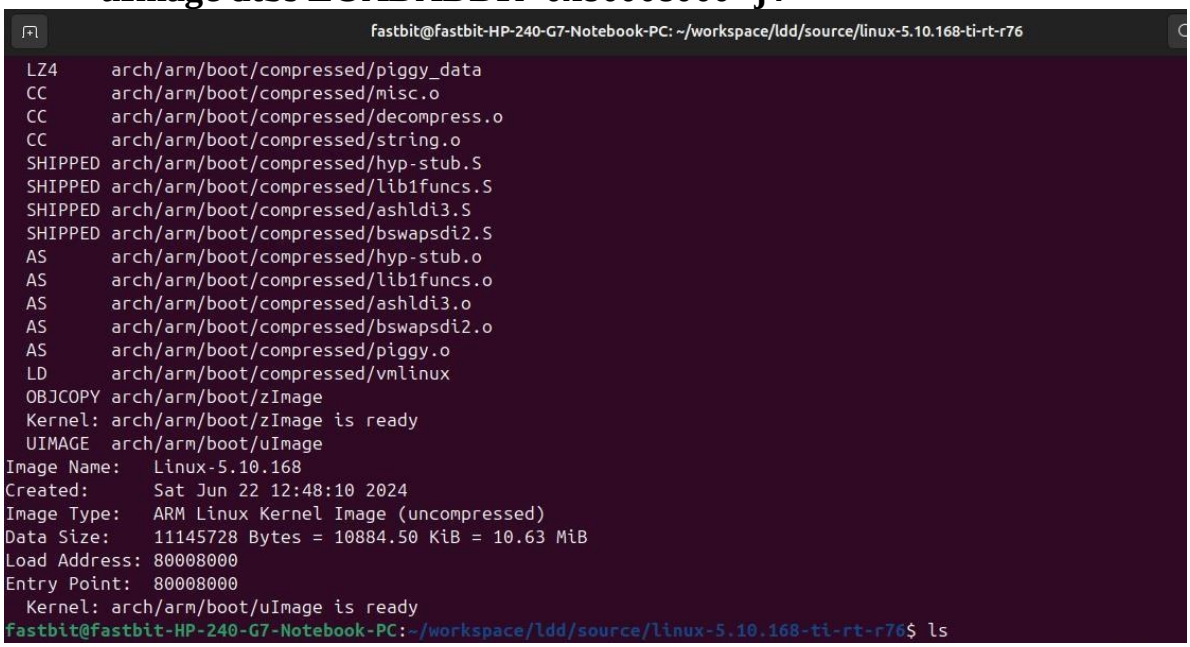
2. creates a .config file by using default config file given by the vendor.
   make ARCH=arm bb.org_defconfig



3. This step is optional. Run this command only if you want to change some kernel settings before compilation.
   make ARCH=arm CROSS_COMPILE=arm-linux-gnueabihf- menuconfig

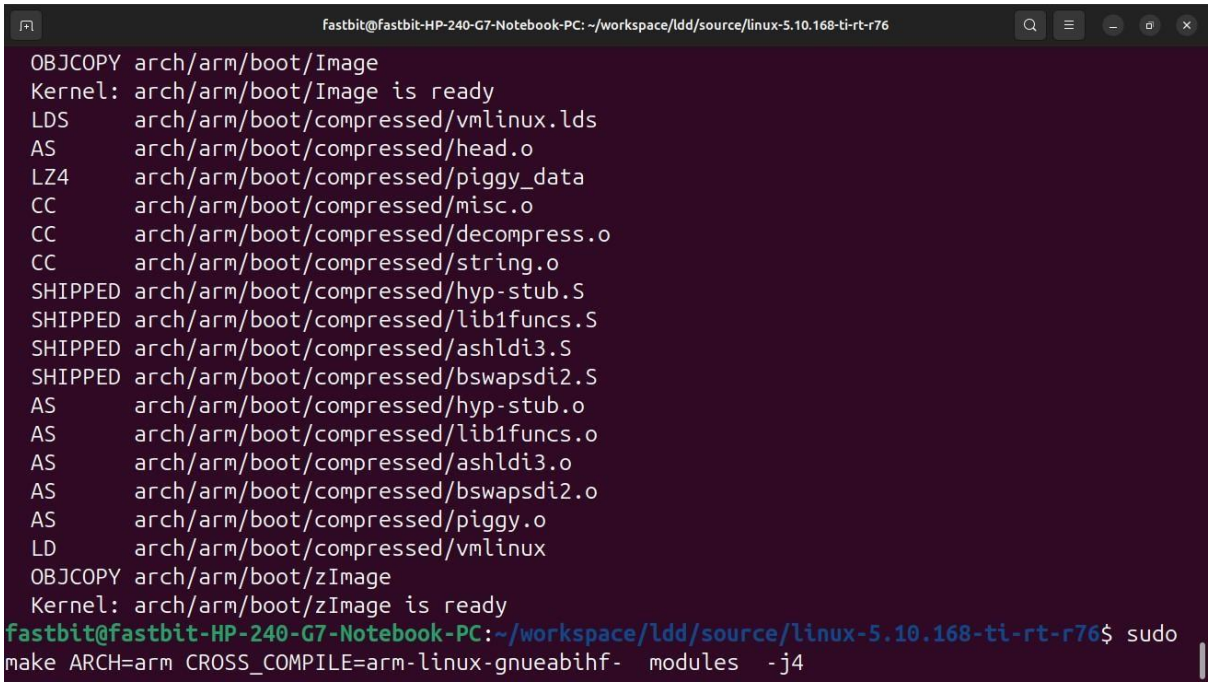
4. Kernel source code compilation. This stage creates a kernel image "uImage" also all the device tree source files will be compiled, and dtbs will be generated

   make ARCH=arm CROSS_COMPILE=arm-linux-gnueabihf- uImage dtbs LOADADDR=0x80008000 -j4



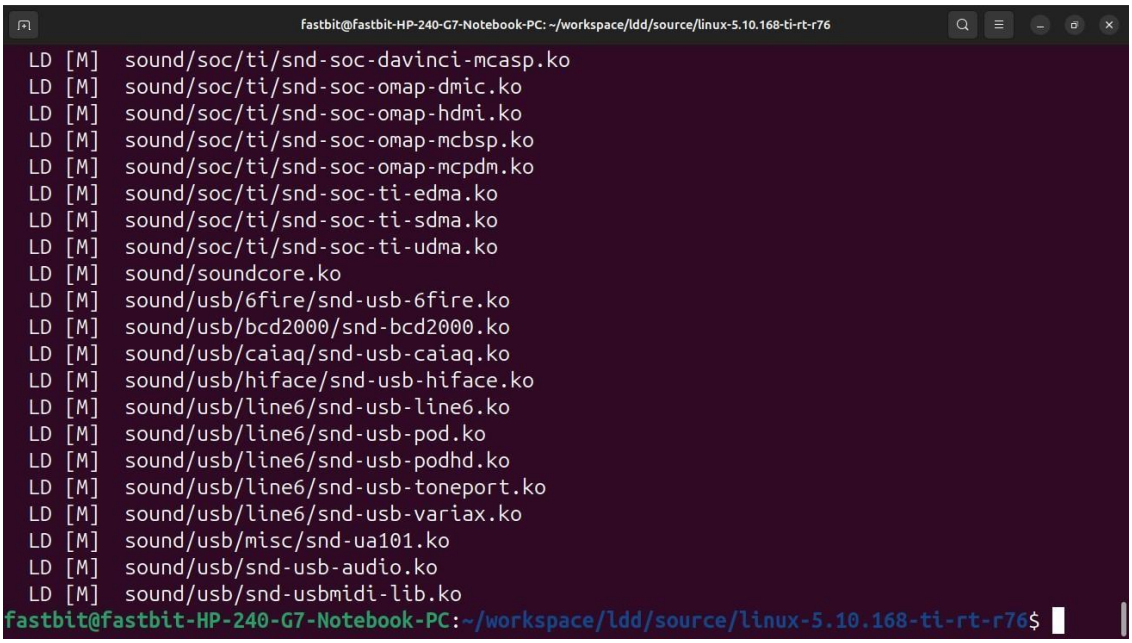
OR

make ARCH=arm CROSS_COMPILE=arm-linux-gnueabihf- zImage dtbs LOADADDR=0x80008000 -j4

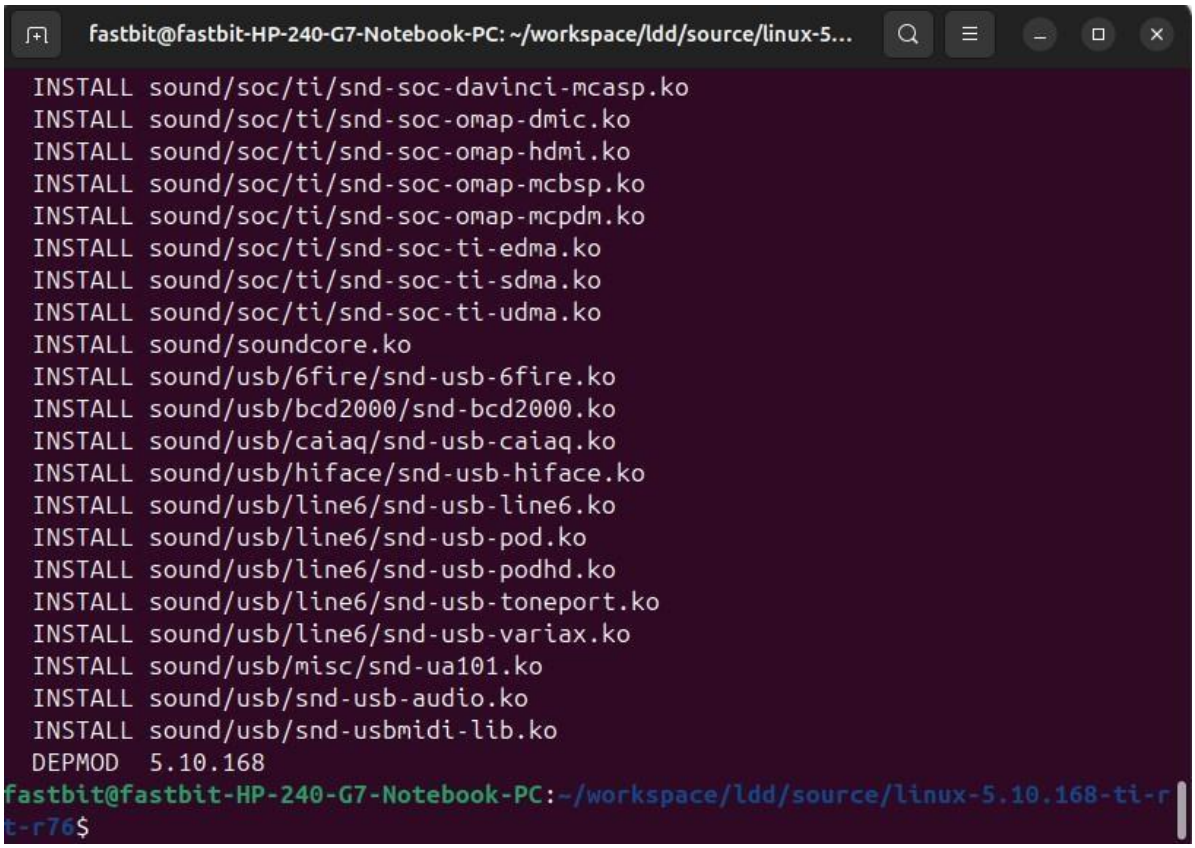


5. This step builds and generates in-tree loadable(M) kernel modules(.ko).

make ARCH=arm CROSS_COMPILE=arm-linux-gnueabihf- modules -j4



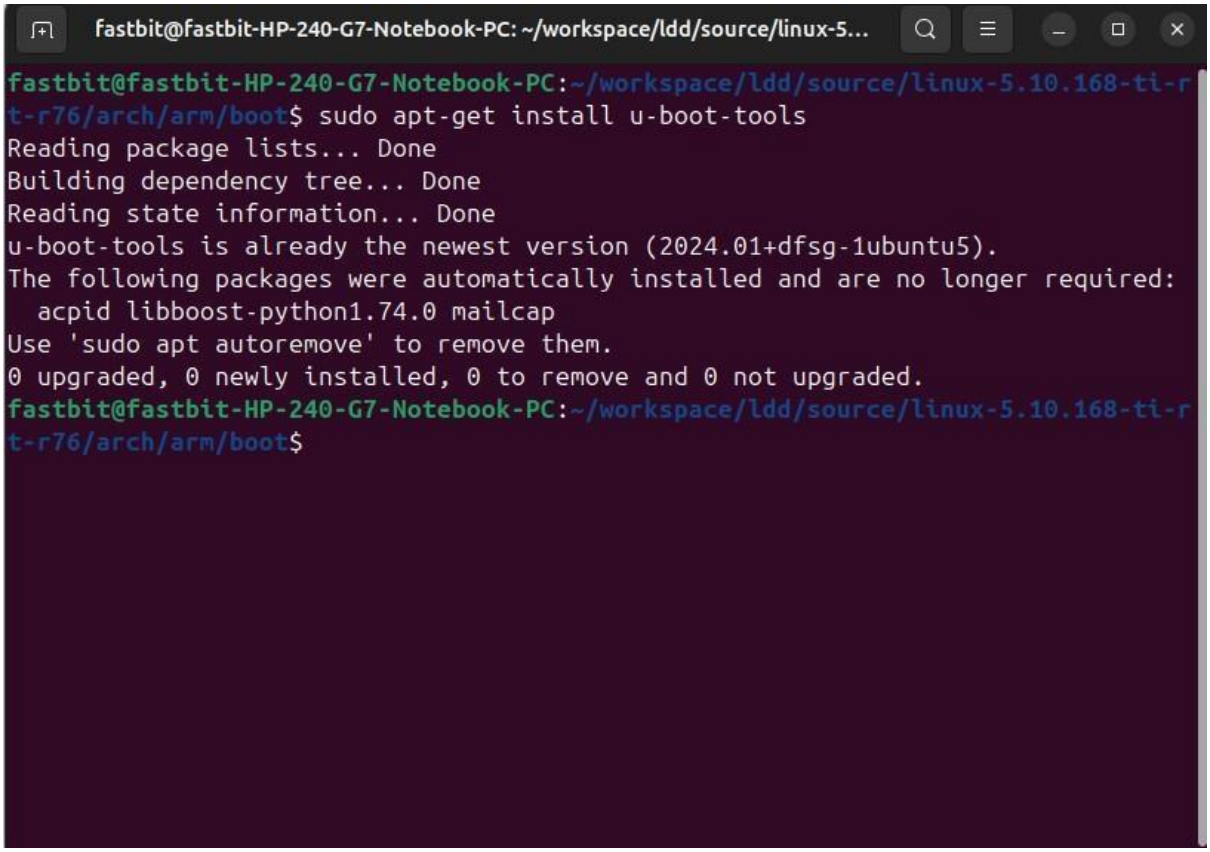
6. This step installs all the generated .ko files in the default path of the computer (/lib/modules/<kernel_ver>)
   sudo make ARCH=arm modules_install.



Step 4: Convert the zImage format kernel image to uImage.

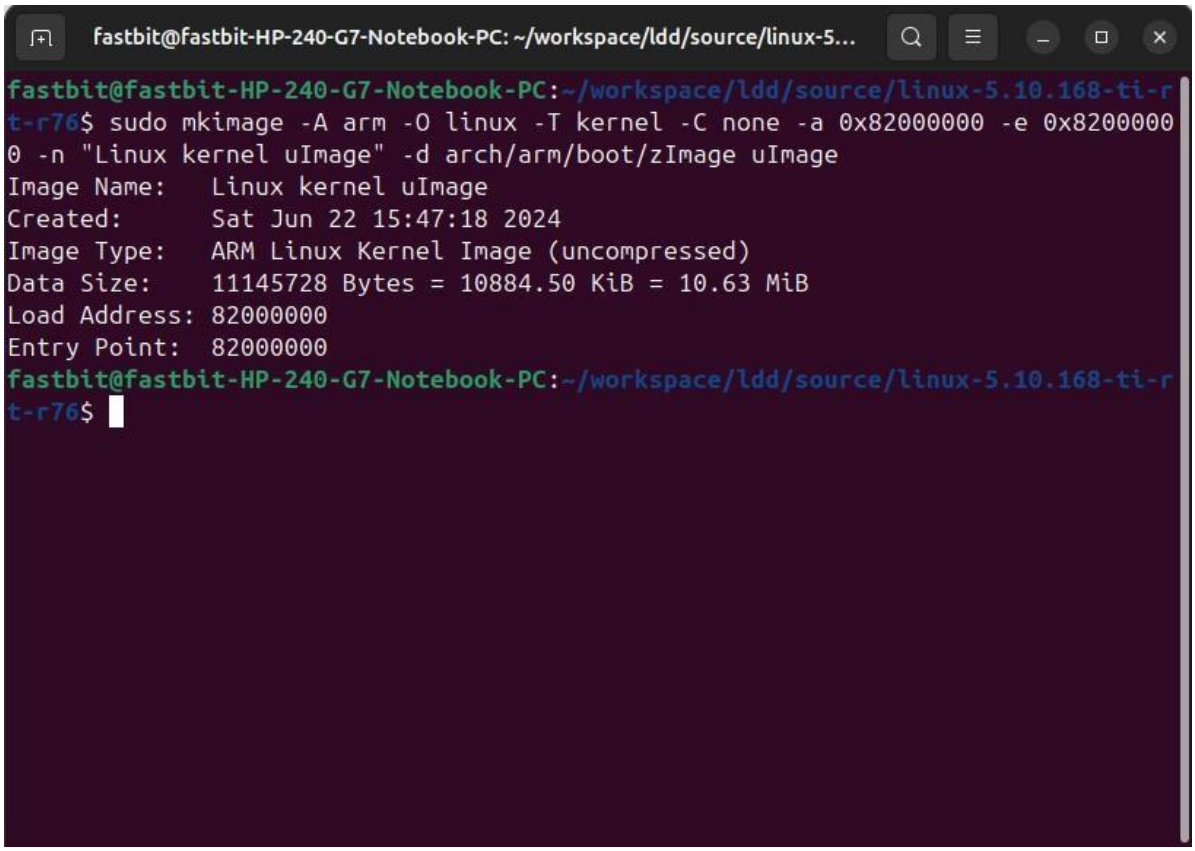
Note: During the kernel compilation, if only the zImage is generated, you can continue with step 4. Otherwise, you can skip step 4 and proceed directly to step 5.

1. Install the u-boot tools by using the command **sudo apt-get install u-boot-tools.**



2. Once you have this installed, then you need to take your zImage file and determine its file path. **workspace/ldd/source/liinux_5.10.168_BBB/arch/arm/boot/**

3. Enter the command in the directory to convert the **zImage** to **uImage**. **mkimage -A arm -O linux -T kernel -C none -a 0x82000000 -e 0x82000000 -n "Linux kernel uImage" -d arch/arm/boot/zImage uImage.**


fastbit@fastbit-HP-240-G7-Notebook-PC: ~/workspace/ldd/source/linux-5...
fastbit@fastbit-HP-240-G7-Notebook-PC:~/workspace/ldd/source/linux-5.10.168-ti-rt-r76$ sudo mkimage -A arm -O linux -T kernel -C none -a 0x82000000 -e 0x82000000 -n "Linux kernel uImage" -d arch/arm/boot/zImage uImage
Image Name: Linux kernel uImage
Created: Sat Jun 22 15:47:18 2024
Image Type: ARM Linux Kernel Image (uncompressed)
Data Size: 11145728 Bytes = 10884.50 KiB = 10.63 MiB
Load Address: 82000000
Entry Point: 82000000
fastbit@fastbit-HP-240-G7-Notebook-PC:~/workspace/ldd/source/linux-5.10.168-ti-rt-r76$

Step 5: Updating uImage, DTB and Copying Modules to SD Card.

1. Insert the SD card into a card reader and open it on your computer.
   - Access the boot partition.
   - Rename the existing **uImage** file to **uImage-back**.

2. Open the terminal and navigate to the source directory:
   cd linux-5.10.168-ti-rt-r76/arch/arm/boot/

3. Copy the **uImage** file to the SD card's boot partition:
   cp uImage/media/<username>/BOOT/

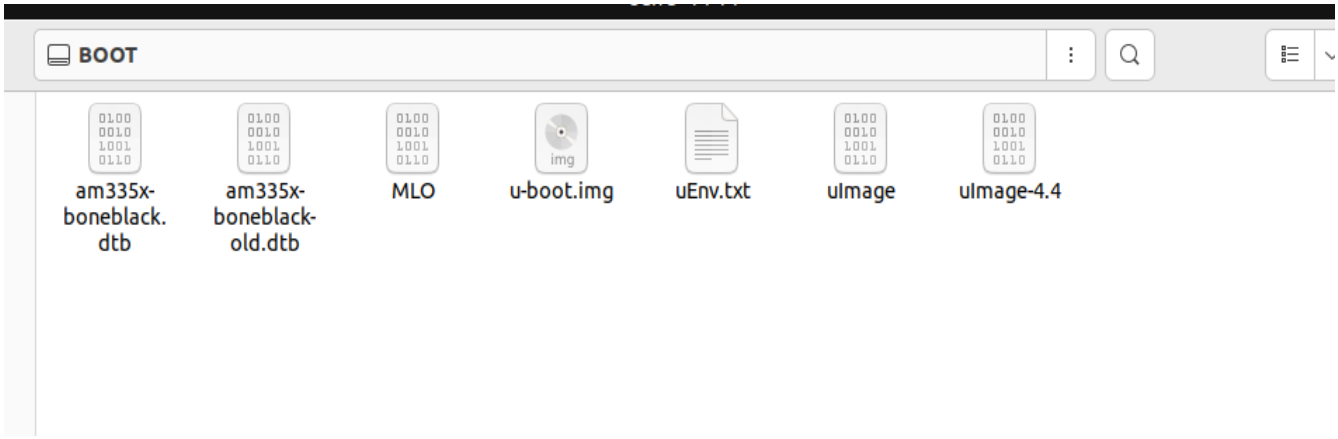
4. Open the /lib/modules/ directory and - Copy the newly created folder to the SD card's root file system:
   cd /lib/modules/
   ls
   sudo cp -a 5.10.168/ /media/ <username>/ROOTFS/lib/modules/

5. Sync the changes to ensure data is written to the SD card properly
   sync

6. Open the source directory in the terminal

7. Navigate to **/arch/arm/boot/dts**.

8. Copy the dtb file to the BOOT partition using the command
   cp am335x-boneblack.dtb /media/<username> /BOOT/



Step 6: Boot the beagle bone black by using the SD card.

1. Unmount the SD card from the PC and insert it into the SD card slot of the beagle bone black board.

2. Boot the board from the SD card.