

Installing the Kernel Source

Output showing the new kernel (5.8) is on my BeagleBoard

```
Last login: Thu Oct 1 23:02:16 2020 from 192.168.7.1
debian@beaglebone:~$ uname -a
Linux beaglebone 5.8.10-bone16 #1xross PREEMPT Thu Oct 1 16:34:59 EDT 2020 armv7l
GNU/Linux
debian@beaglebone:~$
```

Cross-Compiling

Output of doing the cross compile to the BeagleBoard:

```
emily@emily-VirtualBox:~/exercises$ scp a.out debian@192.168.7.2:.
Debian GNU/Linux 10

BeagleBoard.org Debian Buster IoT Image 2020-07-20

Support: https://bbb.io/debian

default username:password is [debian:temppwd]

a.out                                                    100% 8308    938.7KB/s   00:00
emily@emily-VirtualBox:~/exercises$ ssh debian@192.168.7.2 ./a.out
Debian GNU/Linux 10

BeagleBoard.org Debian Buster IoT Image 2020-07-20

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default username:password is [debian:temppwd]

Hello, World! Main is executing at 0x4bb5ad
This address (0xbe990c20) is in our stack frame
This address (0x4cc010) is in our bss section
This address (0x4cc008) is in our data section
emily@emily-VirtualBox:~/exercises$
```

Kernel Modules

Output of Hello kernel module:

```
debian@beaglebone:~/exploringBB/extras/kernel/hello$ sudo rmmod hello
debian@beaglebone:~/exploringBB/extras/kernel/hello$ dmesg -H | tail -2
[Oct 1 19:44] EBB: Hello world from the BBB LKM!
[Oct 1 19:45] EBB: Goodbye world from the BBB LKM!
debian@beaglebone:~/exploringBB/extras/kernel/hello$
```

Output of ebbchar kernel Module:

```
End of the program
debian@beaglebone:~/exploringBB/extras/kernel/ebbchar$ sudo ./test
Starting device test code example...
Type in a short string to send to the kernel module:
Emily is testing this module!!!
Writing message to the device [Emily is testing this module!!!].
Press ENTER to read back from the device...

Reading from the device...
The received message is: [Emily is testing this module!!!]
End of the program
debian@beaglebone:~/exploringBB/extras/kernel/ebbchar$ dmesg -H | tail -8
[ +24.674350] EBBChar: Device has been opened 1 time(s)
[ +8.237562] EBBChar: Received 14 characters from the user
[ +8.002247] EBBChar: Sent 14 characters to the user
[ +0.000629] EBBChar: Device successfully closed
[Oct 1 20:23] EBBChar: Device has been opened 2 time(s)
[ +13.549130] EBBChar: Received 31 characters from the user
[ +0.742873] EBBChar: Sent 31 characters to the user
[ +0.000675] EBBChar: Device successfully closed
debian@beaglebone:~/exploringBB/extras/kernel/ebbchar$
```

Output of gpio_test kernel module:

```
debian@beaglebone:~/exploringBB/extras/kernel/gpio_test$ dmesg -H | tail -1
[ +0.294924] GPIO_TEST: Interrupt! (button state is 1)
debian@beaglebone:~/exploringBB/extras/kernel/gpio_test$
```