DragonBoard™ 410c based on Qualcomm® Snapdragon™ 410E processor

USB to Ethernet Adapter Application Note

September 2016
## Revision history

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<tr>
<td>B</td>
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<td>Initial release.</td>
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1 Introduction

1.1 Purpose

This application note explains how to enable the USB to Ethernet adapter on the DragonBoard™ 410c.

1.2 Acronyms and abbreviations

<table>
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<th>Acronym</th>
<th>Definition</th>
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<tr>
<td>DNS</td>
<td>Domain Name System</td>
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<tr>
<td>GND</td>
<td>Ground</td>
</tr>
<tr>
<td>GUI</td>
<td>Graphical User Interface</td>
</tr>
<tr>
<td>MFR</td>
<td>Manufacturer</td>
</tr>
<tr>
<td>NDC</td>
<td>Network Destination Code</td>
</tr>
<tr>
<td>QTI</td>
<td>Qualcomm Technologies, Inc.</td>
</tr>
<tr>
<td>UART</td>
<td>Universal Asynchronous Receiver Transmitter</td>
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<td>USB</td>
<td>Universal Serial Bus</td>
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</table>

1.3 USB to Ethernet adapters used

The USB to Ethernet adapters shown below were used during testing, Apple USB to Ethernet adapter A1277 and Cable Matters USB to Ethernet adapter
Figure 1-1 USB to ethernet adapters
# Configuring the Kernel

## 2.1 Rebuilding the kernel

1. Follow the instructions in the guide at this link to get the latest Android build:

## 2.2 Commands to modify and rebuild kernel

1. Change the directory to the source root:
   ```bash
cd $BUILDROOT
source build/envsetup.sh
lunch msm8916_64-userdebug
```

2. Launch the kernel config run the command:
   ```bash
   make -j8 kernelconfig
   ```
   Where `-j8` depends on the Linux machine cores; change accordingly.
   You should see the configuration window as shown below:

3. Select Device Drivers -> Network device support -> USB Network Adapters
4. Choose the kernel built in option for:

   <*> Multi-purpose USB Networking Framework
   <*> ASIX AX88xxx Based USB 2.0 Ethernet Adapters
   <*> ASIX AX88179/178A USB 3.0/2.0 to Gigabit Ethernet
   <*> CDC NCM support

**NOTE:** You may need to select other drivers for USB to Ethernet adapters that are different from the picture above.

5. Save and exit from the kernel config menu.

6. Run the following command:

   make -j8 bootimage

   booti.img will be generated at out/target/product/msm8916_64/boot.img

### 2.3 Flashing the kernel to DragonBoard 410c and testing ping

1. Bring the DragonBoard 410c into fastboot by holding VOL- during power up. Once in fastboot, you can flash the booti.img using the following command:

   fastboot flash boot booti.img

2. Reboot the device

3. You can keep the USB to Ethernet adapter connected at bootup or connect when device boots into Android.

   check the following prints or log messages using dmesg on serial console when the USB Ethernet adapter is detected and registered when you connect to one of the USB2.0 ports on DragonBoard 410c. Note that you need to have USB to UART TTL 1.8V cable connected to J8 to pin 1 (GND), 11 (UART1_TX), 13 (UART1_RX) to see console trace messages. Set the
baud rate to 115200. You cannot use adb shell as only device mode or host mode is supported at anytime on DragonBoard 410c.

```bash
usb 2-1: new high-speed USB device number 2 using msm_ehci_host
usb 2-1: New USB device found, idVendor=05ac, idProduct=1402
usb 2-1: New USB device strings: Mfr=1, Product=2, SerialNumber=3
usb 2-1: Product: Apple USB Ethernet Adapter
usb 2-1: Manufacturer: Apple Inc.
usb 2-1: SerialNumber: 1CBF36
asix 2-1:1.0: eth1: register 'asix' at usb-msm_ehci_host.1
asix 2-1:1.0: eth1: register 'asix' at usb-msm_ehci_host.1, ASIX AX88772
```

4. To get networking working you need to run the following commands on shell according to your network configuration:

```bash
su
netcfg ➔ should list eth0
netcfg eth0 up
netcfg eth0 dhcp
ndc network create 100
ndc network interface add 100 eth0
ndc network route add 100 eth0 xx.xx.xx.x/xx

 ➔ ip route show will list the address that you can use
ndc resolver setnetdns eth0 8.8.8.8 8.8.4.4
route add default gw xx.xxx.xx.xx dev eth0

 ➔ gw is the gateway address of your network

netcfg
Will list eth0 and its IP address
```

5. You can test ping between your PC and DragonBoard 410c

ping [www.google.com](http://www.google.com) should succeed as well.

**NOTE:** Please note that on console DNS resolution succeeds, by default other GUI applications on Android Lollipop may not use eth0 interface. This feature is being considered to be added in the next Android release for DragonBoard 410c.
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