

# AIM-Edge QC01W Developer User Manual

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2025/03/24  
V1.0

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## Revision History

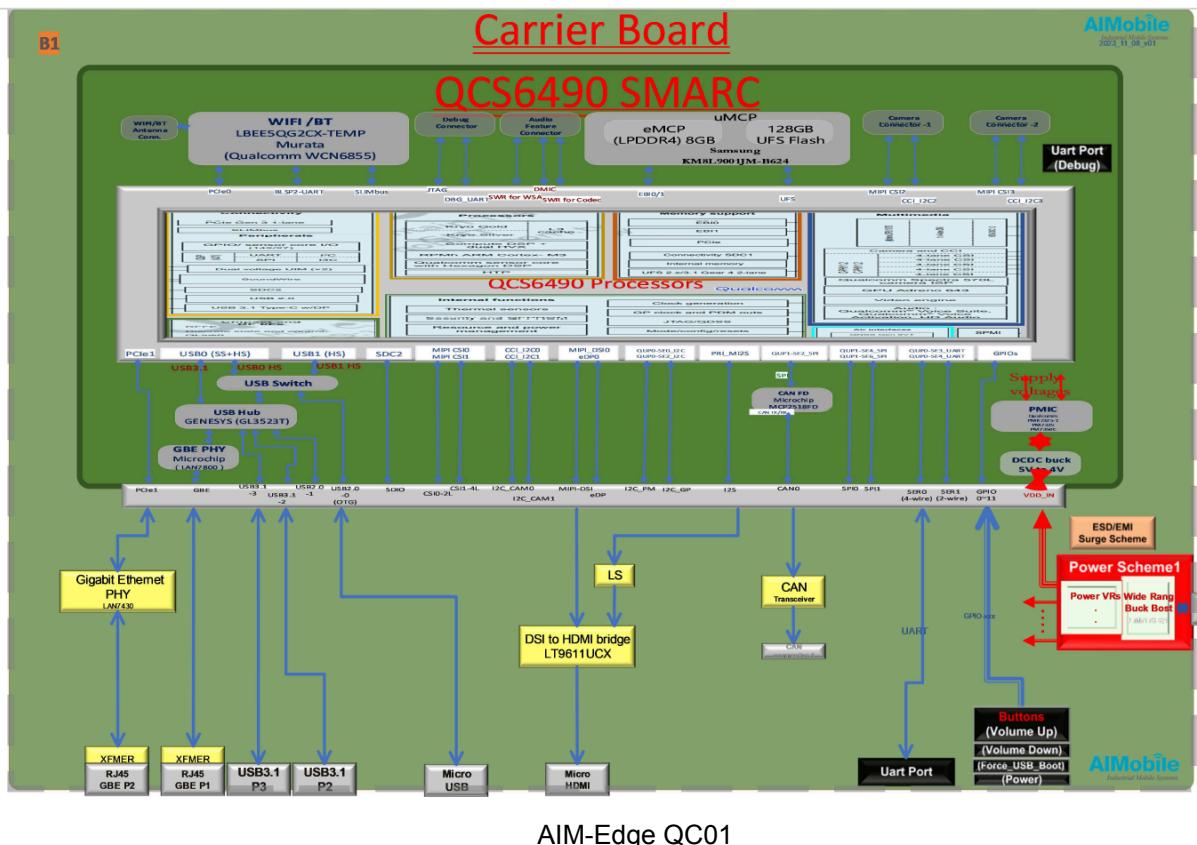
Date	Version	Modification
2024/07/01	1.0	Creation
2024/08/09	1.1	<ol style="list-style-type: none"><li>1. Added caution about not running “apt upgrade”</li><li>2. Corrected the package name for Ubuntu Minimal Desktop</li><li>3. Refined the section on refreshing images</li></ol>
2025/2/18	1.2	<ol style="list-style-type: none"><li>1. Added Bluetooth setup instruction</li></ol>

## 1. Introduction

AIM-Edge QC01W is a Qualcomm QCS6490 Edge AI computing device running on Linux platform.

Product Specification	
<b>CPU</b>	Qualcomm QCS6490 Octa-Core Kyro 670 CPU (1x2.7GHz, 3x2.4GHz, 4x1.9GHz)
<b>GPU</b>	Qualcomm® Adreno™ 643
<b>AI Performance</b>	up to 12 TOPS
<b>SoM</b>	AIMobile AIM6490S
<b>Storage</b>	128GB UFS Flash (uMCP)
<b>Memory</b>	8GB LPDDR4x RAM (uMCP)
<b>I/O</b>	4 x USB 3.0 Type A 1 x USB 3.0 Type C 1 x HDMI (Max Resolution 1920x1080@60Hz) 1 x RJ45 (1 GbE) 1 x RJ45 (10 GbE) 4 x Digital In(5V) / 4 x Digital Output port 1 x Status LED
<b>Button/Key</b>	1 x Reset button 1 x Recovery button 1 x Function button 1 x Power button
<b>Dimensions</b>	95(W) x 130(D) x 40(H) mm
<b>Operating System</b>	Linux Ubuntu 20.04
<b>Power</b>	1 x DC-In 19V adaptor

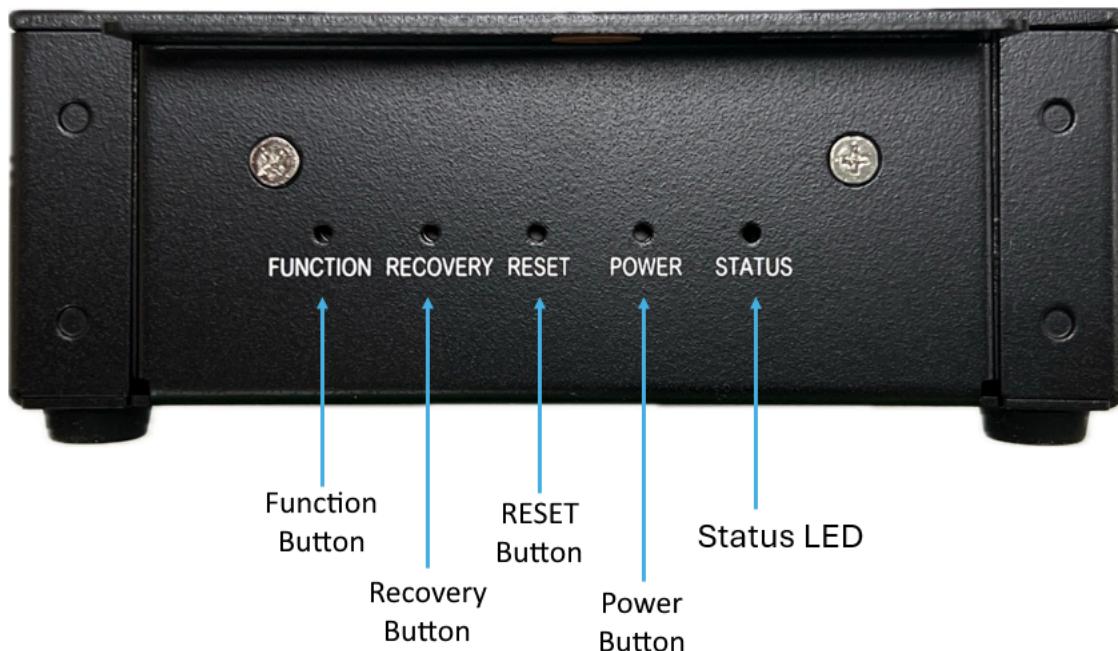
## 2. System Architecture



AIM-Edge QC01

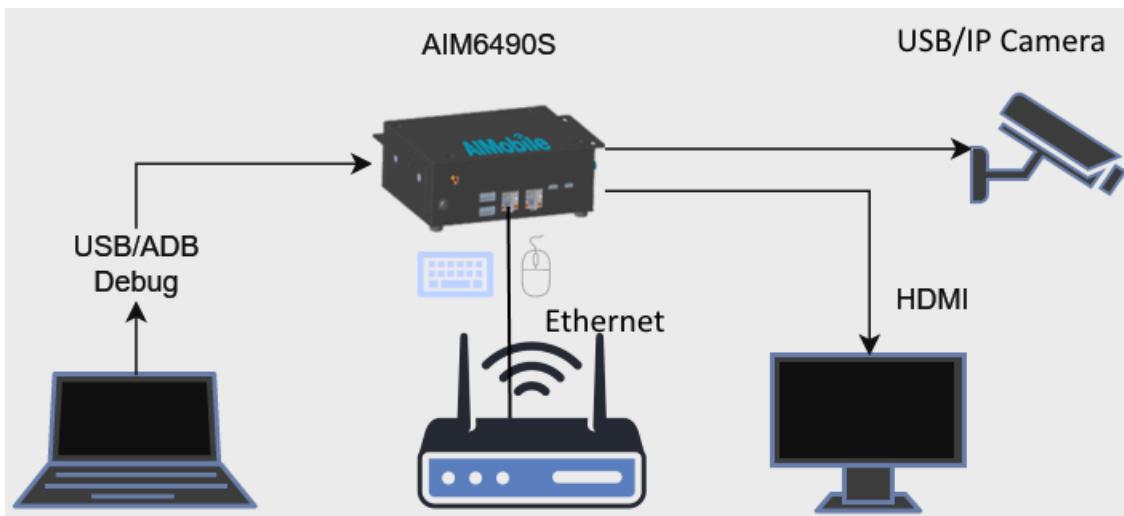
### 3. I/O Port Overview





## 4. Quick Start

### 4.1 Solution Overview



### 4.2 Power Up

1. Connect the AC adapter, then power up the box by either pressing the power button or connecting the debug USB cable to your NB / PC (for USB boot-up).



2. During boot-up, the system will turn on the LED as an indication that it's on.



3. Connect the Micro USB, RJ45, and HDMI cables.



## 5. Reflash Image

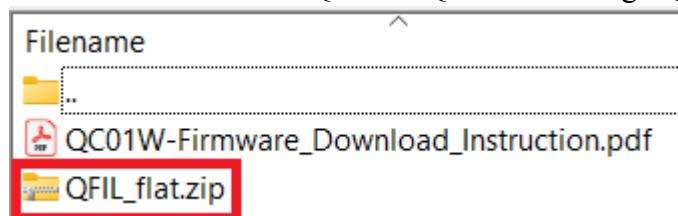
Check the SFTP server to download the image reflash instruction “QC01W-Firmware\_Download\_Instruction.pdf”. Follow the instructions to download the necessary tools and image to your Host NB / PC, and reflash the image to QC01W.

The reflash image is hosted on our SFTP server. The information is as follows:

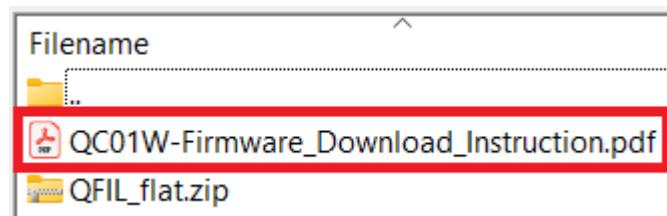
- Host: 99.64.152.69
- User: qcs6490
- Password: Great#525Inventec

### 5.1 Download the Reflash Image File (QFIL\_Setup)

Find the files in “/Files/QC01W/QCUbuntu/image/QFIL\_flat.zip”.



### 5.2 Reflash Image Instruction

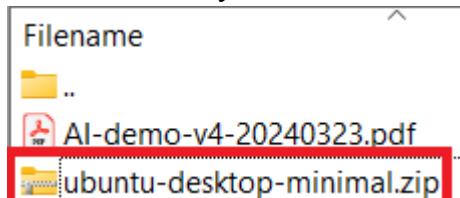


Follow 'QC01W-Firmware\_Download\_Instruction.pdf' to reflash the image of QC01W.

## 6. Install Ubuntu Desktop Minimal

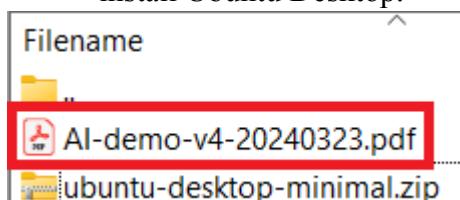
### 6.1 Install Ubuntu Desktop Minimal File

- Download “/Files/QC01W/QCUbuntu/ubuntu/ubuntu-desktop-minimal.zip” from the SFTP server to your host NB/PC.



### 6.2 Instruction for Installation

- Follow the instructions in “/Files/QC01W/QCUbuntu/ubuntu/AI-demo-v4-20240323.pdf” to install Ubuntu Desktop.



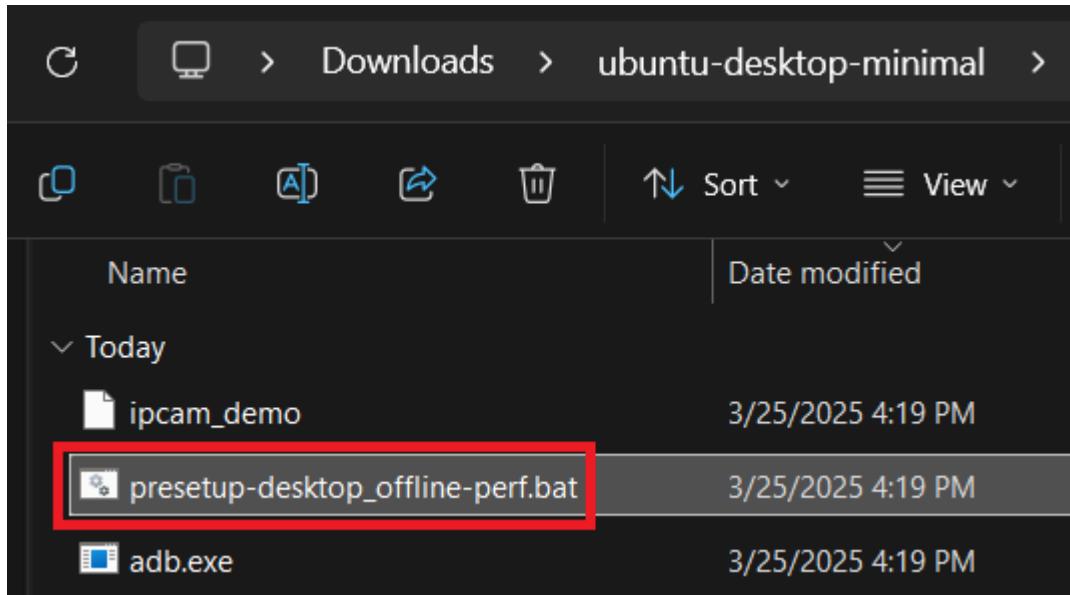
### 6.3 Verify Internet Access

- Enter `ping -c 3 www.google.com`. If the internet access is not ready, the output should be as shown below.

```
C:\AI-Computing-0307>adb shell "ping -c 3 www.google.com"
PING www.google.com (172.217.163.36): 56 data bytes
64 bytes from 172.217.163.36: icmp_seq=0 ttl=108 time=2.628 ms
64 bytes from 172.217.163.36: icmp_seq=1 ttl=109 time=2.282 ms
64 bytes from 172.217.163.36: icmp_seq=2 ttl=110 time=2.781 ms
--- www.google.com ping statistics ---
3 packets transmitted, 3 packets received, 0% packet loss
round-trip min/avg/max/stddev = 2.282/2.564/2.781/0.209 ms
```

### 6.4 Run `presetup-desktop\_offline-perf.bat` to install Ubuntu

- Ensure the USB Type-C is connected and internet access is ready, then double-click 'presetup-desktop\_offline-perf.bat' to start installation.



The installation will proceed as follows:

```
FreeCommander - DOS - preshape-desktop.bat
Get:293 http://ports.ubuntu.com/ubuntu-ports focal/universe arm64 fonts-cantarell all 0.1.11-2 [250 kB]
Get:294 http://ports.ubuntu.com/ubuntu-ports focal/main arm64 fonts-lohit-deva all 2.95.4-4 [78.9 kB]
Get:295 http://ports.ubuntu.com/ubuntu-ports focal/main arm64 fonts-sahadeva all 1.0-4 [136 kB]
Get:296 http://ports.ubuntu.com/ubuntu-ports focal/main arm64 fonts-nakula all 1.0-3 [167 kB]
Get:297 http://ports.ubuntu.com/ubuntu-ports focal/main arm64 fonts-samyak-deva all 1.2.2-4 [65.1 kB]
Get:298 http://ports.ubuntu.com/ubuntu-ports focal/main arm64 fonts-deva all 2:1.2 [2918 B]
Get:299 http://ports.ubuntu.com/ubuntu-ports focal/main arm64 fonts-freefont-ttf all 20120503-10 [2440 kB]
Get:300 http://ports.ubuntu.com/ubuntu-ports focal/main arm64 fonts-gargi all 2.0-4 [42.4 kB]
Get:301 http://ports.ubuntu.com/ubuntu-ports focal/main arm64 fonts-gubbi all 1.3-3 [59.4 kB]
Get:302 http://ports.ubuntu.com/ubuntu-ports focal/main arm64 fonts-gujr-extra all 1.0.1-1 [150 kB]
Get:303 http://ports.ubuntu.com/ubuntu-ports focal/main arm64 fonts-lohit-gujr all 2.92.4-4 [35.2 kB]
Get:304 http://ports.ubuntu.com/ubuntu-ports focal/main arm64 fonts-samyak-gujr all 1.2.2-4 [51.6 kB]
25% [Working] 406 kB/s 12min 48s
```

If you see the screen as shown below, it indicates an Ubuntu server issue. Press “CTRL + C ” to stop the process and contact the designer if you encounter any errors during installation.

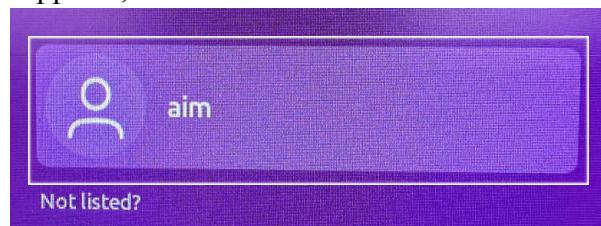
```
Err:288 http://ports.ubuntu.com/ubuntu-ports focal-updates/main arm64 firefox arm64 124.0.1+build1-0ubuntu0.20.04.1
  Connection failed [IP: 185.125.190.39 80]
Err:814 http://ports.ubuntu.com/ubuntu-ports focal-updates/main arm64 libc6-dbg arm64 2.31-0ubuntu9.14
  Connection failed [IP: 185.125.190.36 80]
```

Press any key to reboot the box and remove the (RJ45) cable without encountering any errors once the installation is complete.

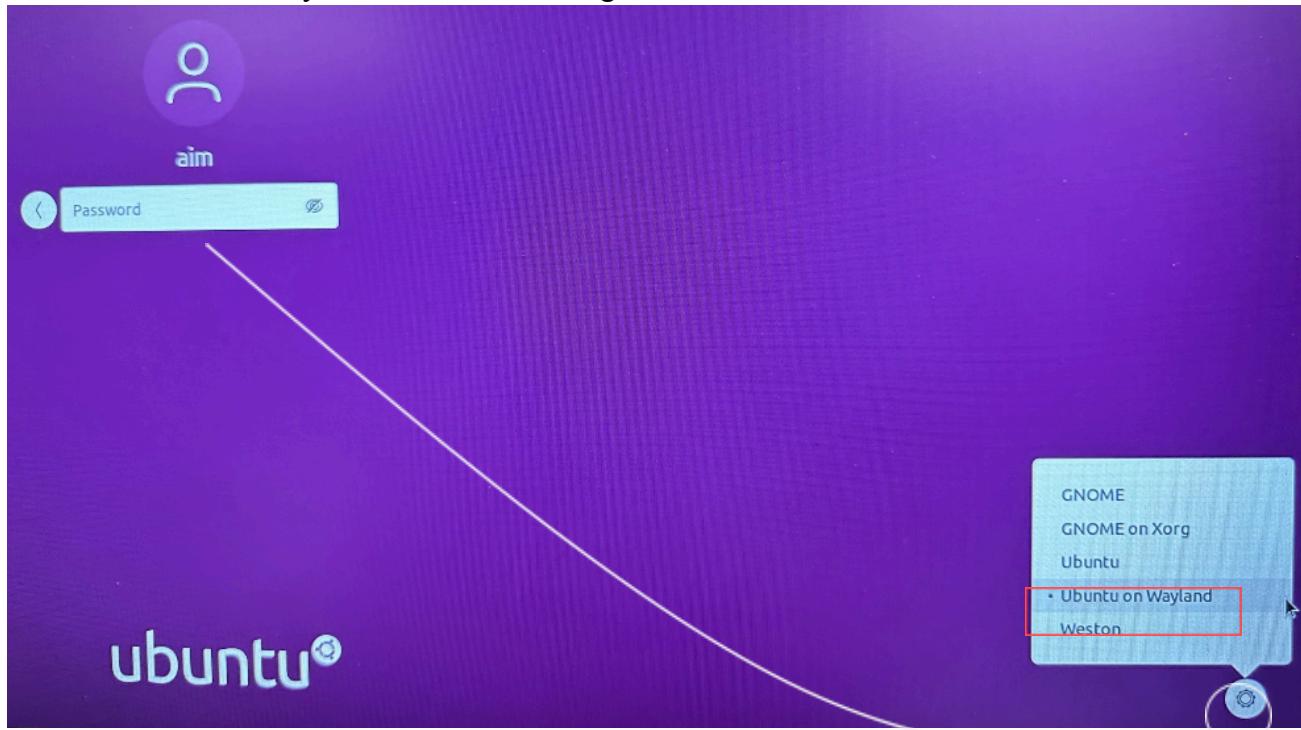
```
=====
Please remove (RJ45) and keep HDMI/Debug MicroUSB cables connected when no error.
Then press any key to continue.
=====
```

Now wait for the box to restart and check that the Ubuntu Desktop appears on HDMI display.

First, when the login screen appears, click the account.

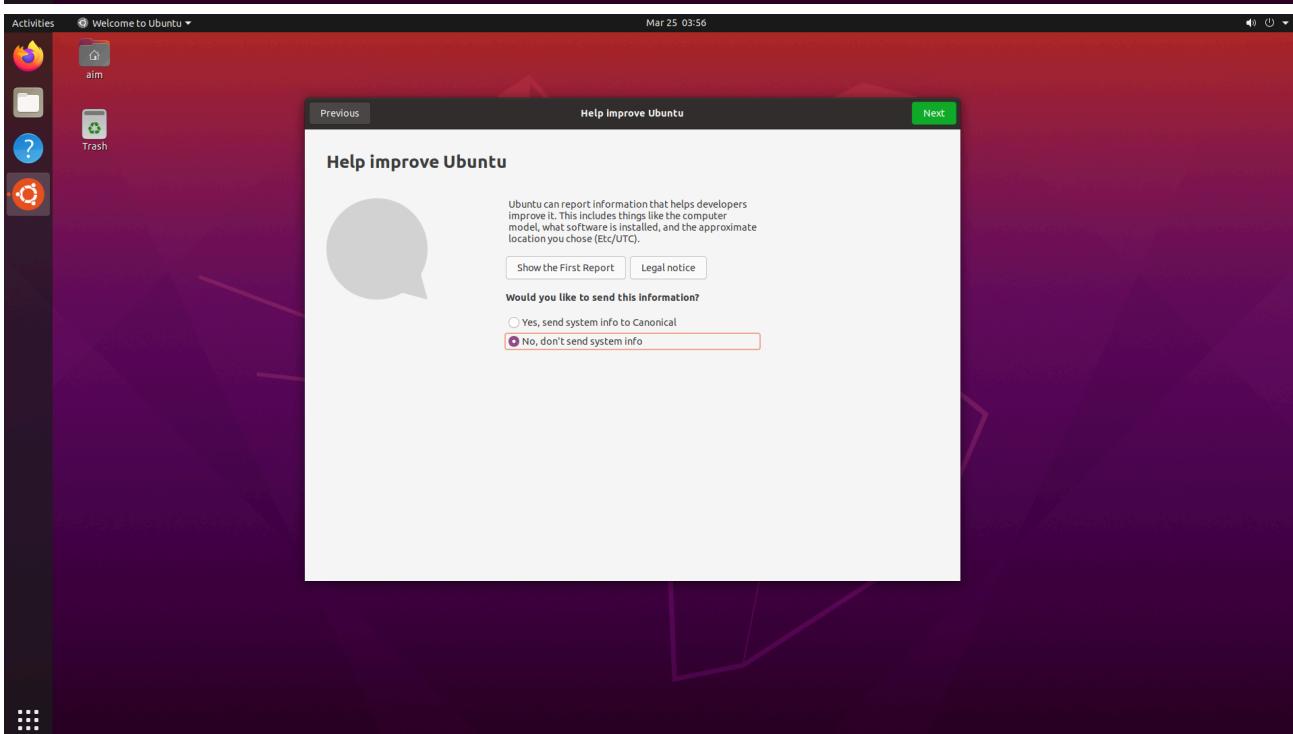
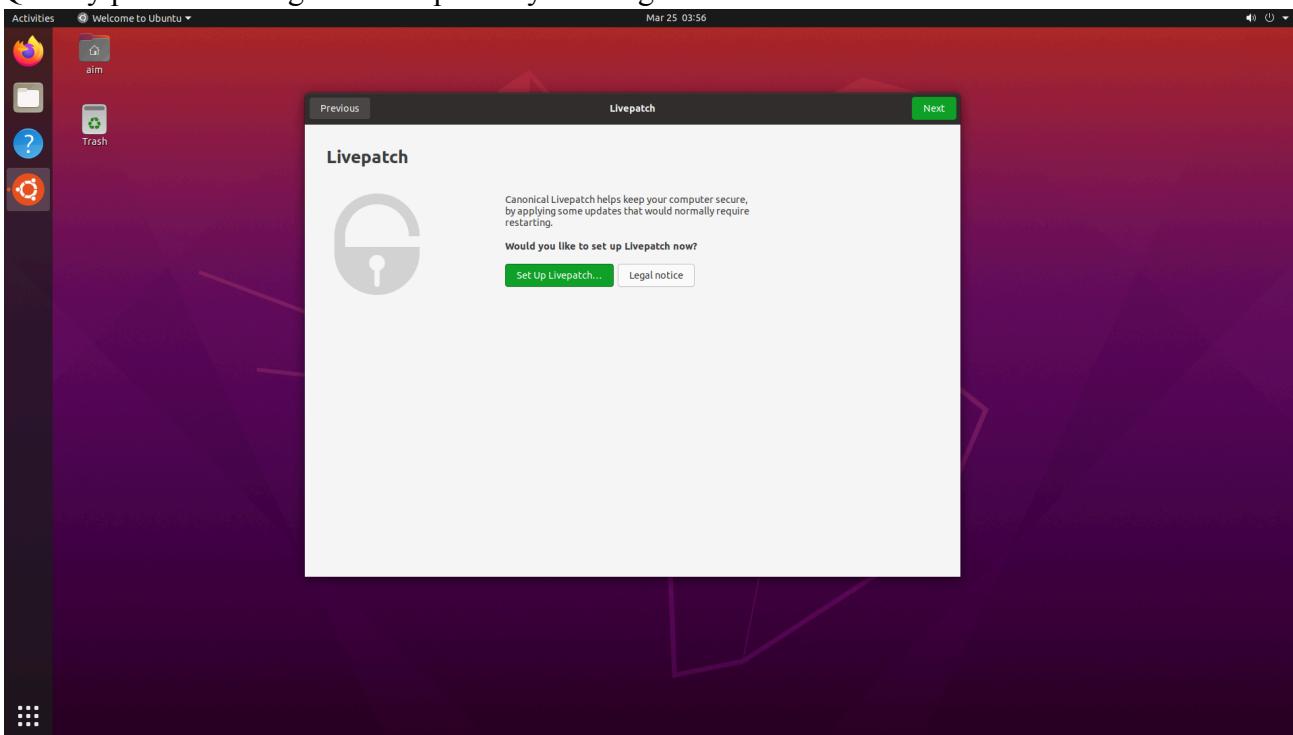


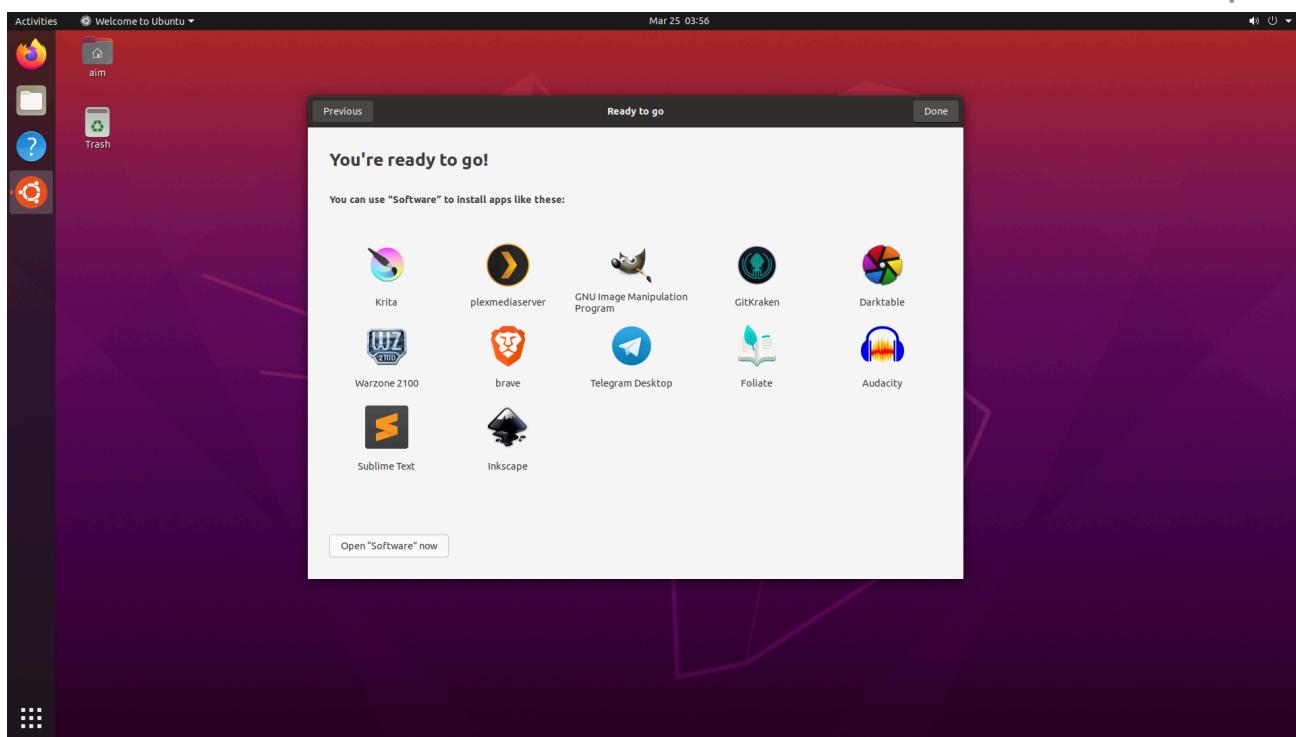
Choose “Ubuntu on wayland” from GUI settings.



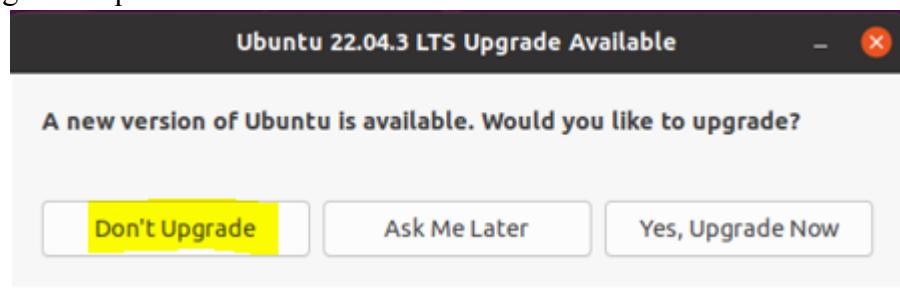
- Username: aim
- Password: aim123

Quickly proceed through the Livepatch by clicking “Next”.

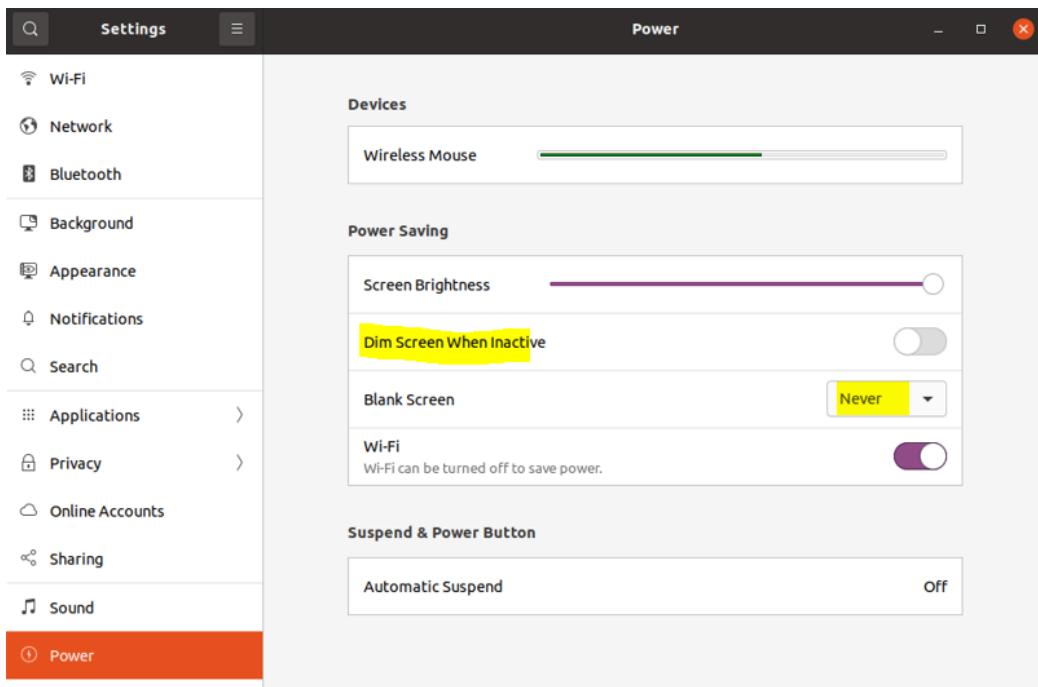




Dismiss the upgrade request.

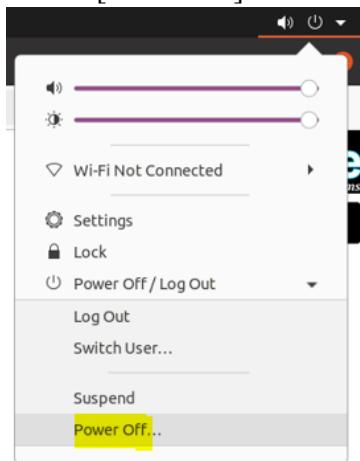


Disable the black screen and hibernation mode for the demo.



## 6.5 Power Off

1. Remove the Micro USB cable if connected.
2. Select [Power off] from Ubuntu Power Settings.



3. Wait until the blue LED indicator is out.
4. Then remove the DC-in.

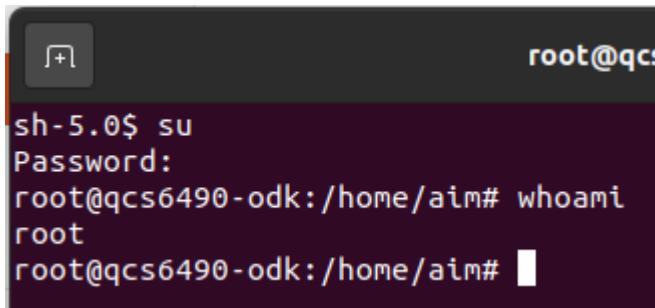
## 7. Software Development

### 7.1 Pre-installed Software SDK / Library List

Qualcomm Libraries	- SNPE SDK: 2.17.0 - gstreamer plugin
--------------------	--

### 7.2 Root Mode Access

Users can switch to **root** (root password: **oelinux123**) by **su** command if needed.



A screenshot of a terminal window. The title bar says "root@qcs". The terminal prompt is "sh-5.0\$ su". A password is entered: "Password:". The response shows the user has switched to root: "root@qcs6490-odk:/home/aim# whoami". The user then types "root" again, and the terminal shows "root@qcs6490-odk:/home/aim#".

### 7.3 Install Software Package

Users can install software packages using `apt`. You need to switch to root using the `su` command first.

**Cautions:**

- `sudo` is not supported.
- **Do not run `apt upgrade`**, as it may break package dependencies.
- If you accidentally run `apt upgrade` and are unable to add other packages, please refer to Section 5 and 6 to reflash the Ubuntu Desktop Image

## 7.4 Run AI Model on Qualcomm SNPE

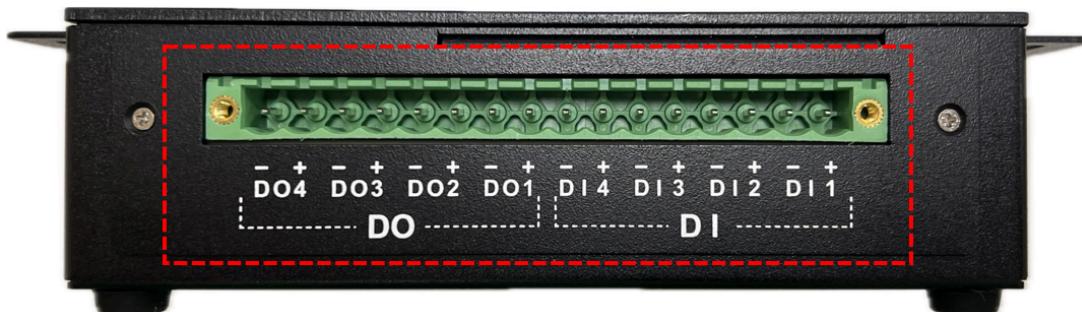
The AIM-Edge QC01U has the Qualcomm SNPE SDK pre-installed, allowing users to develop AI software / models on it. Below are the documents for using the SNPE SDK.

- Setting model: [Snapdragon Neural Processing Engine SDK: Tutorials Setup \(qualcomm.com\)](#)
- Run model: [Snapdragon Neural Processing Engine SDK: Running the Inception v3 Model \(qualcomm.com\)](#)
- Deploy model: [Snapdragon Neural Processing Engine SDK: C++ Tutorial - Build the Sample \(qualcomm.com\)](#)
- Convert AI model to ONNX format: [Snapdragon Neural Processing Engine SDK: ONNX Model Conversion](#)
- Quantizing a Model (to be executed on DSP): [Snapdragon Neural Processing Engine SDK: Quantizing a Model](#)
- [Snapdragon Neural Processing Engine SDK: Android Tutorial \(qualcomm.com\)](#)
- Website: [Snapdragon Neural Processing Engine SDK: Main Page \(qualcomm.com\)](#)

## 7.5 Retrieve USB / IP Camera Video Stream

- Sample command to retrieve USB camera video using GStreamer:  
`gst-launch uridecodebin uri=v4l2:///dev/video0 ! autovideosink`
- Sample command to retrieve IP camera RTSP video stream using GStreamer  
`gst-launch uridecodebin uri=rtsp://{{IP camera rtsp url}} ! autovideosink`

## 7.6 DI/DO Usage



DI1	309
DI2	310

DI3	311
DI4	312
DO1	305
DO2	306
DO3	307
DO4	308

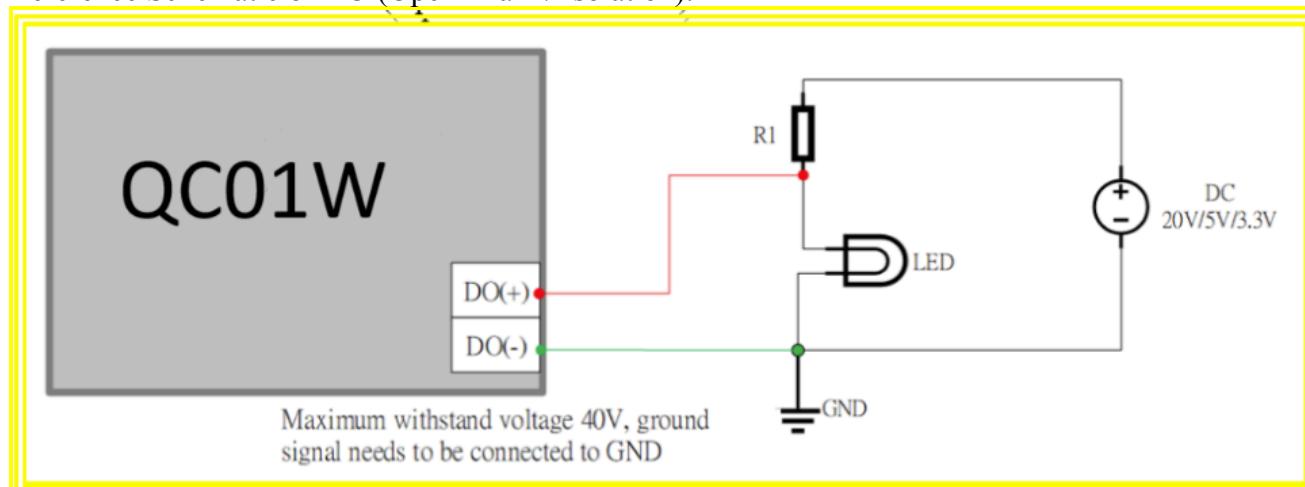
Example for DI:

```
echo 309 > /sys/class/gpio/export
echo in > /sys/class/gpio/gpio309/direction
cat /sys/class/gpio/gpio309/value
echo 309 > /sys/class/gpio/unexport
```

Example for DO:

```
echo 305 > /sys/class/gpio/export
echo out > /sys/class/gpio/gpio305/direction
echo 1 > /sys/class/gpio/gpio305/value
echo 0 > /sys/class/gpio/gpio305/value
echo 305 > /sys/class/gpio/unexport
```

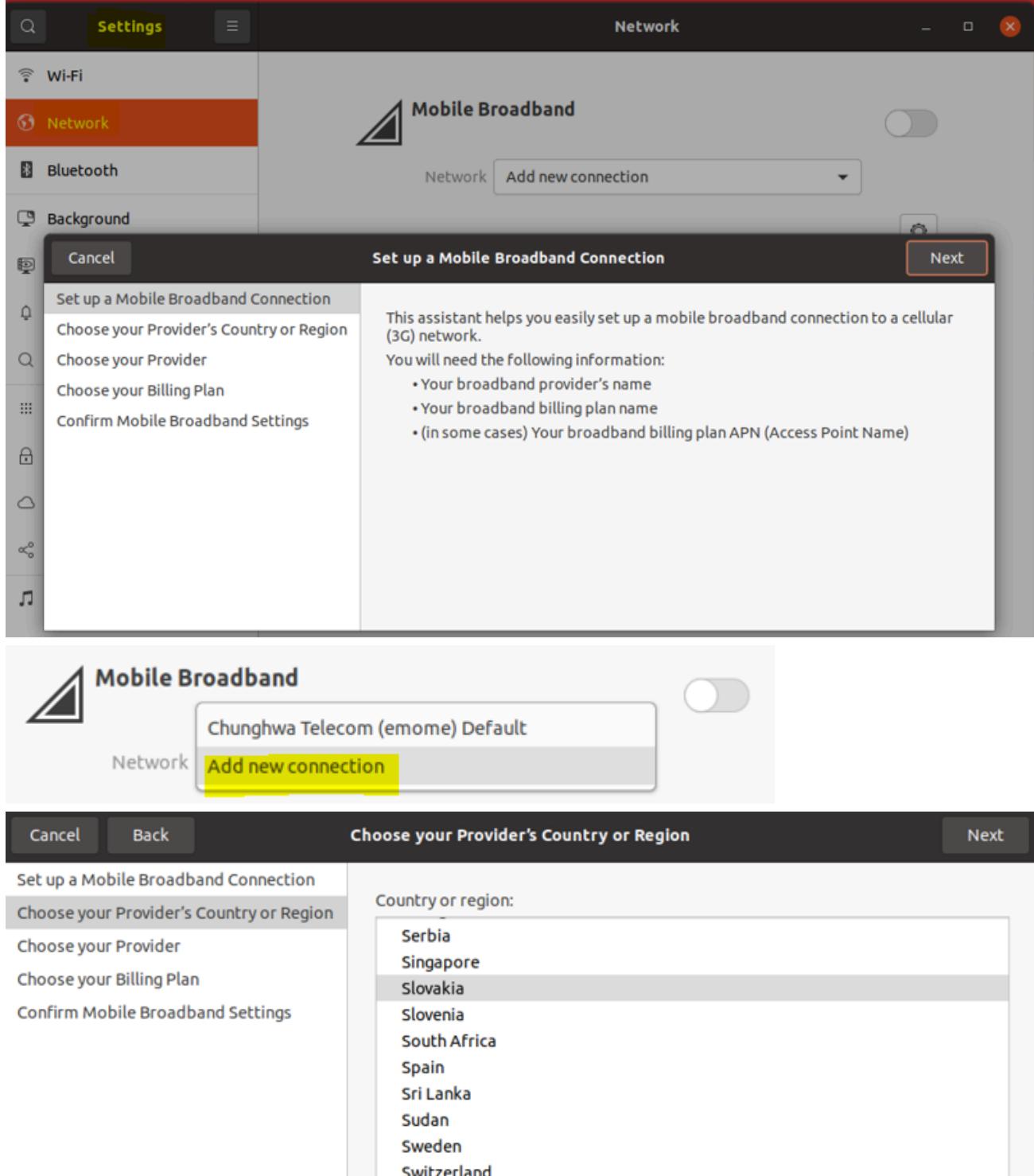
Reference Schematic of DO (Open Drain / Isolation):



Each DO port is capable of driving relay coils rated up to 150mA at 12V, 24V or 40V.

## 7.7 Configure Mobile Network

- Setup may vary depending on the telecommunications vendor's configuration.



Choose your Provider

Set up a Mobile Broadband Connection

Choose your Provider's Country or Region

Choose your Provider

Choose your Billing Plan

Confirm Mobile Broadband Settings

Choose your Provider from a list:

Provider

- Chunghwa Telecom (emome)
- Far EasTone / KGT
- TW Mobile
- TransAsia
- Vibo Telecom / Aurora

Default

Default

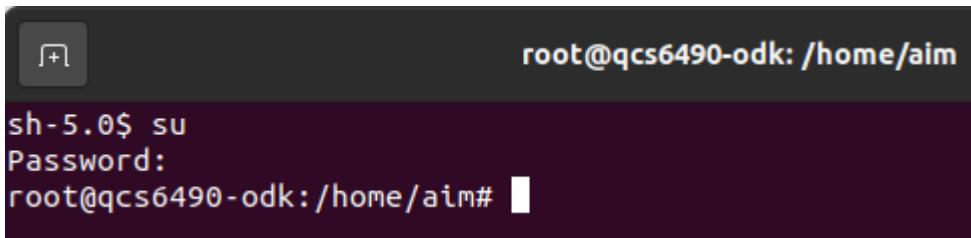
CHT MMS

My plan is not listed...

Selected plan APN (Access Point Name):

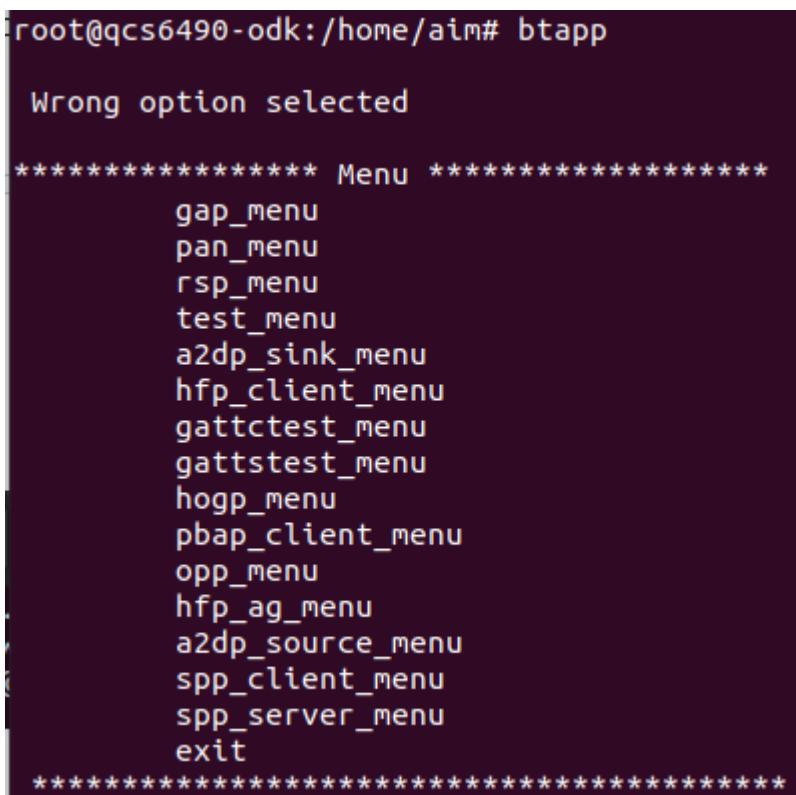
## 8. Bluetooth Setup

1. Open the Terminal by pressing Ctrl + Alt + T and enter Admin mode
  - a. Password: olinux123



A screenshot of a terminal window titled "root@qcs6490-odk: /home/aim". The window shows the command "sh-5.0\$ su" followed by a password prompt "Password:". The user has entered their password and is now at the root prompt "root@qcs6490-odk: /home/aim#".

2. Type 'btapp' in the terminal to run the btapp application
  - a. If the program gets stuck, press Enter to continue



A screenshot of a terminal window titled "root@qcs6490-odk: /home/aim# btapp". The window displays the following text:  
Wrong option selected  
\*\*\*\*\* Menu \*\*\*\*\*  
gap\_menu  
pan\_menu  
rsp\_menu  
test\_menu  
a2dp\_sink\_menu  
hfp\_client\_menu  
gattctest\_menu  
gattstest\_menu  
hogp\_menu  
pbap\_client\_menu  
opp\_menu  
hfp\_ag\_menu  
a2dp\_source\_menu  
spp\_client\_menu  
spp\_server\_menu  
exit  
\*\*\*\*\*

3. Type `gap\_menu` to set up the Bluetooth device function

```
gap_menu
*****
    Menu *****
    enable
    disable
    inquiry
    cancel_inquiry
    get_role_req<space><bt_address>      eg. get_role_req 00:11:22:33:44:55
    pair<space><bt_address><space><transport>    eg. pair 00:11:22:33:44:55 0(auto)/1(BREDR)/2(BLE)
    unpair<space><bt_address>      eg. unpair 00:11:22:33:44:55
    inquiry_list
    bonded_list
    get_state
    get_bt_name
    get_bt_address
    set_bt_name<space><bt name>      eg. set_bt_name MDM_Fluoride
    set_scan_mode<space><scan mode value (range 0-2)>    eg. set_scan_mode 0 --0-BT_SCAN_MODE_NONE,1
    set_afh<space><AFH_Host_Channel_Classification>    eg. set_afh 112233445566778899f0
    send_hci_cmd<space><hci_cmd>      eg. send_hci_cmd 01,04,05,33,8b,9e,0a,00 - For Inquiry
    read_clock<space><which_clock range(0-1)><space><bt_address>      eg. read_clock 0(local)/1(acl co
    main_menu
    switch_role_req<bt_address><space><new_role>      eg. switch_role_req 00:11:22:33:44:55 0 or get_r
*****

```

4. Type `enable` to turn on the Bluetooth function

```
*****
enable
wcnssfilter: no process found
btsnoop: no process found
qcbtdaemon: no process found
diag:successfully connected to socket 68
diag:successfully connected to socket 78
BT State is ON

```

5. Type `inquiry` to scan for nearby Bluetooth devices

```
*****
inquiry
Inquiry Started
Device Found details:
Found device Addr: 40:9c:a7:89:fa:04
Found device Name: HCA-6010
Device Type is: 1
Inquiry Stopped automatically

```

## 9. Reference

Qualcomm developer site: <https://developer.qualcomm.com/>

Qualcomm SNPE SDK:

<https://www.qualcomm.com/developer/software/neural-processing-sdk-for-ai>

## 10. Known Issues

Interoperability issue with HDMI	Workaround: Connect HDMI to external display before powering on the AI box.
Package dependencies are broken with `apt upgrade` command	Workaround: Avoid to use `apt upgrade`
Bluetooth does not persist after logout, remains non-integrated with Ubuntu's system settings, and always appears as OFF	Workaround: Use BTApp to scan, pair, and connect Bluetooth devices

## 11. Troubleshooting

### 11.1 Broken Dependencies

```
root@qcs6490-odk:/home/aim/Documents# apt-get install git
Reading package lists... Done
Building dependency tree
Reading state information... Done
You might want to run 'apt --fix-broken install' to correct these.
The following packages have unmet dependencies:
  git : Depends: liberror-perl but it is not going to be installed
        Depends: git-man (> 1:2.25.1) but it is not going to be installed
        Depends: git-man (< 1:2.25.1-) but it is not going to be installed
        Recommends: less but it is not going to be installed
  poppler-utils : Depends: libpoppler97 (= 0.86.1-0ubuntu1.4) but 0.86.1-0ubuntu1.5 is to be installed
E: Unmet dependencies. Try 'apt --fix-broken install' with no packages (or specify a solution).
root@qcs6490-odk:/home/aim/Documents#
```

Error Message: poppler-utils: Depends: libpoppler97 (= 0.86.1-0ubuntu1.4) but 0.86.1-0ubuntu1.5 is to be installed.

Solution:

1. Open Terminal
2. Switch to root user
3. Run the following command
  - a. apt install --reinstall poppler-utils

```
root@qcs6490-odk:/home/aim# apt-get install git
Reading package lists... Done
Building dependency tree
Reading state information... Done
You might want to run 'apt --fix-broken install' to correct these.
The following packages have unmet dependencies:
git : Depends: liberror-perl but it is not going to be installed
      Depends: git-man (> 1:2.25.1) but it is not going to be installed
      Depends: git-man (< 1:2.25.1-) but it is not going to be installed
      Recommends: less but it is not going to be installed
libc6-dev-arm64-cross : Depends: libc6-arm64-cross (= 2.31-0ubuntu7cross1) but
it is not going to be installed
E: Unmet dependencies. Try 'apt --fix-broken install' with no packages (or specify a solution).
```

Error Message: libc6-dev-arm64-cross: Depends: libc6-arm64-cross (= 2.31-0ubuntu7cross1) but it is not going to be installed

Solution:

4. Open Terminal
5. Switch to root user
6. Run the following command
  - a. dpkg -i --force-overwrite  
`/var/cache/apt/archives/libc6-arm64-cross_2.31-0ubuntu7cross1_all.deb`

```
root@qcs6490-odk:/home/aim# dpkg -i --force-overwrite /var/cache/apt/archives/li
bc6-arm64-cross_2.31-0ubuntu7cross1_all.deb
```

## 11.2 Firefox Crash

Solution:

1. Open Terminal
2. Run the following command
  - `MOZ_ENABLE_WAYLAND=1 firefox`