Operating System

The CM4 router board is compatible with most systems that support Raspberry Pi 4, but most Linux distributions do not optimize the network device scenarios. So OpenWRT and Raspberry Pi OS are recommended.

For Raspberry Pi OS

- If you are using Raspberry Pi OS.

1. Enable USB2.0 Port: After flash the latest image file to TF card and then modify /boot/config.txt file and add following line to the file.

```
dtoverlay=dwc2,dr_mode=host
```

Save it and reboot Raspberry Pi.

2. Enable OLED onboard:

2.1 Enable I2C function, Open a terminal and typing:

```
sudo raspi-config
```

Navigate to `Interface Options` -> `I2C` -> `Enable` -> `YES`.

2.2 Download libaraies from github:

- Open a terminal and Download demo code from:

[https://github.com/adafruit/Adafruit_Python_SSD1306]

```
sudo python -m pip install --upgrade pip setuptools wheel
git clone https://github.com/adafruit/Adafruit_Python_SSD1306.git
cd Adafruit_Python_SSD1306
sudo python setup.py install
pip install Adafruit-BBIO
```

- Run example Demo:

```
cd examples/
python stats.py
```

For Using OpenWRT

- OpenWRT official snapshot version

The official snapshot is the smallest system, using serial terminal control, you need to manually install the Web console, driver, etc. it is recommended for experienced users.

OpenWRT official website: [https://openwrt.org/]

OpenWRT Develop Guide:
[https://openwrt.org/docs/guide-developer/source-code/start]

OpenWRT User Guide: [https://openwrt.org/docs/guide-user/start]

OpenWRT forum: [https://openwrt.org/contact#forum]

OpenWRT on Raspberry Pi CM4:
[https://openwrt.org/toh/hwdata/raspberry_pi_foundation/raspberry_pi_foundation_raspberry_pi_cm4]

OpenWRT Raspberry Pi Foundation:
[https://openwrt.org/toh/raspberry_pi_foundation/raspberry_pi]

OpenWRT Use BuildSystem:
[https://openwrt.org/docs/guide-developer/build-system/use-buildsystem]

OpenWRT Build-System:
[https://openwrt.org/docs/guide-developer/build-system/install-buildsystem]

SD Card Installation

Suitable for Compute Module 4 Lite without eMMC version.

1. Requirements

- Card Reader
- Etcher
- 7-Zip Compressed File Manager
- OS image file

Flash the image file to MicroSD card by using etcher imaging tool.

Build OpenWRT Customized Firmware

You can build your own firmware by building OpenWRT from source.

1.Prepare Compile Environment

Flash the latest version of Raspberry Pi OS to TF card(32GB recommended).

Modify /boot/config.txt file and adding the following parameter to enable the USB port function:

```
dtoverlay=dwc2,dr_mode=host
```

- Insert the microSD card or TF card into card slot on CM4 Router Board.
- Connect the power supply(5V/3A) on USB-C port.
- After booting up the system, please connect to internet and typing following command in a terminal:

```
sudo apt-get update
sudo apt-get -y upgrade
```

- Install dependencies packages:

```
sudo apt-get -y install build-essential asciidoc binutils bzip2 libncurses5-dev flex git-core p7zip p7zip-full
sudo apt-get -y install libssl-dev libelf-dev autoconf automake libtool device-tree-compiler gettext libi2c-dev
sudo apt-get -y install libz-dev texinfo
```

- After installing, please reboot your Raspberry Pi CM4 by typing:

```
sudo sync && sudo reboot
```

- Create a folder and download OpenWRT source code by using git tool:

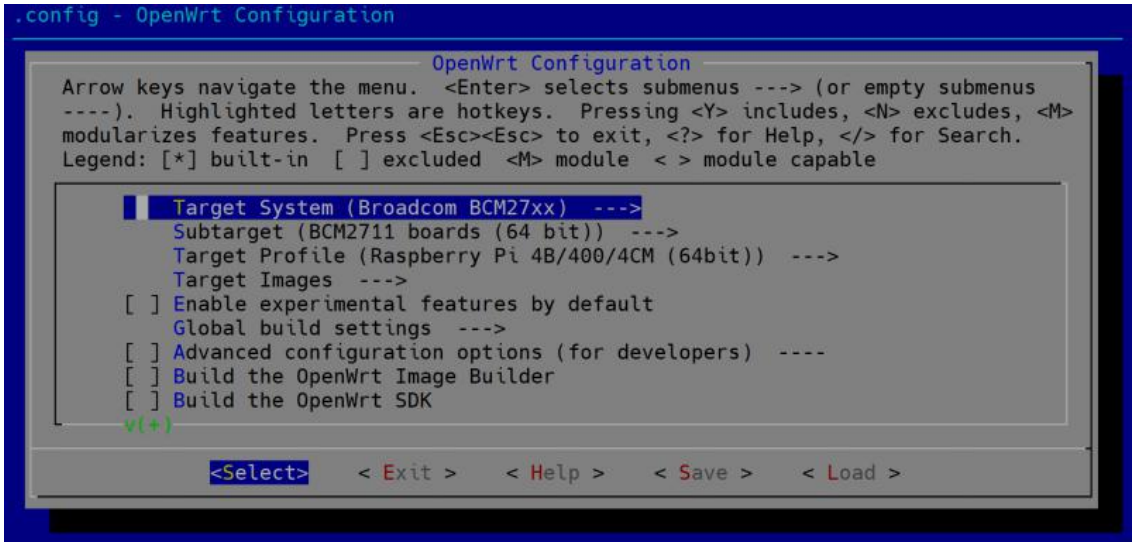
```
mkdir openwrt && cd openwrt
git clone --depth=1 https://github.com/openwrt/openwrt
cd openwrt/
./scripts/feeds update -a
```

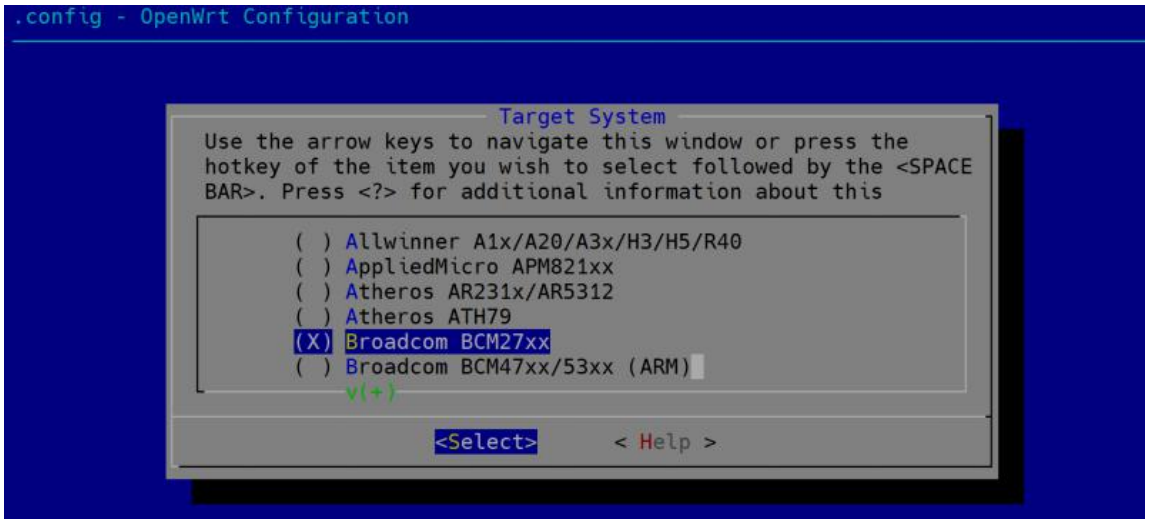
```
./scripts/feeds install -a
```

- Download `luci-app-oled` libraries.

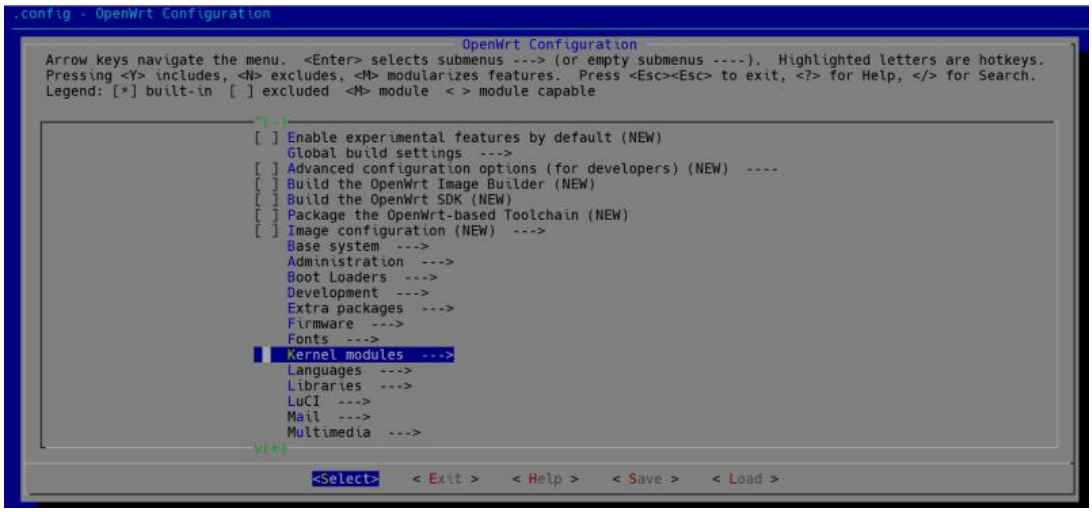
```
cd ~/openwrt/openwrt/package/feeds/luci/
git clone https://github.com/NateLol/luci-app-oled.git
cd ~/openwrt/openwrt/
./scripts/feeds update -a
./scripts/feeds install -a
** Configure the compile options by typing:
<pre> make menuconfig
```

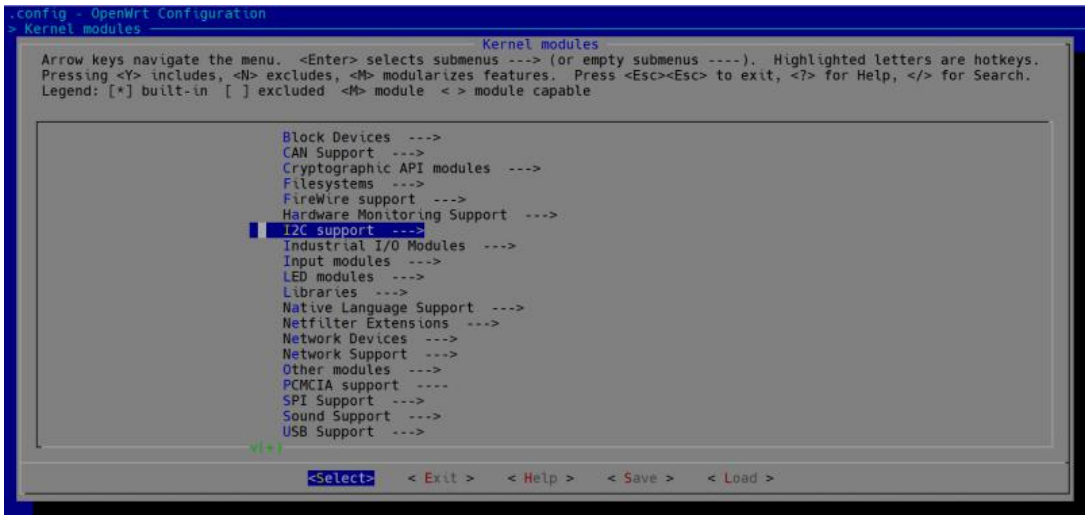
And then select "Target System" and "Target Profile" as following picture:

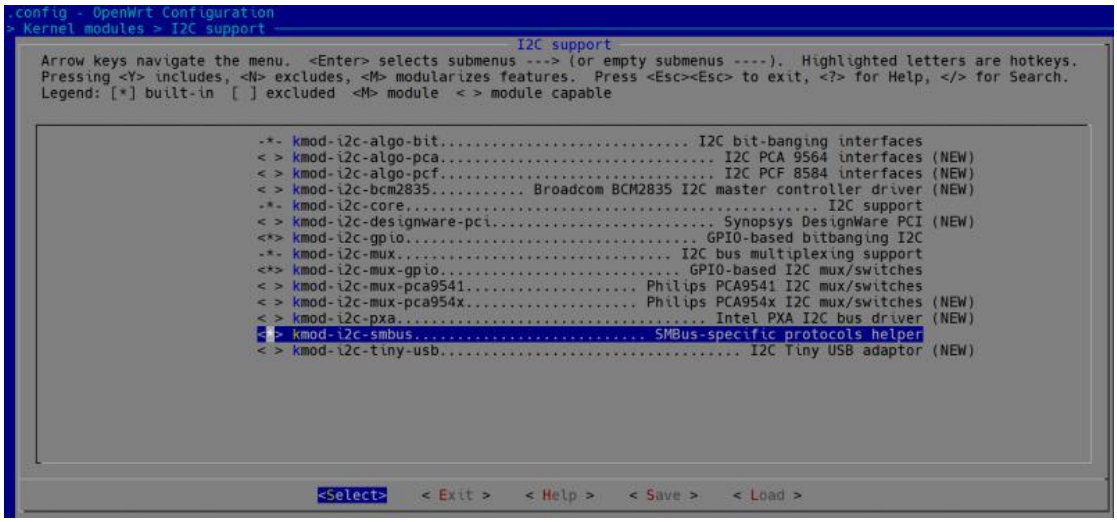




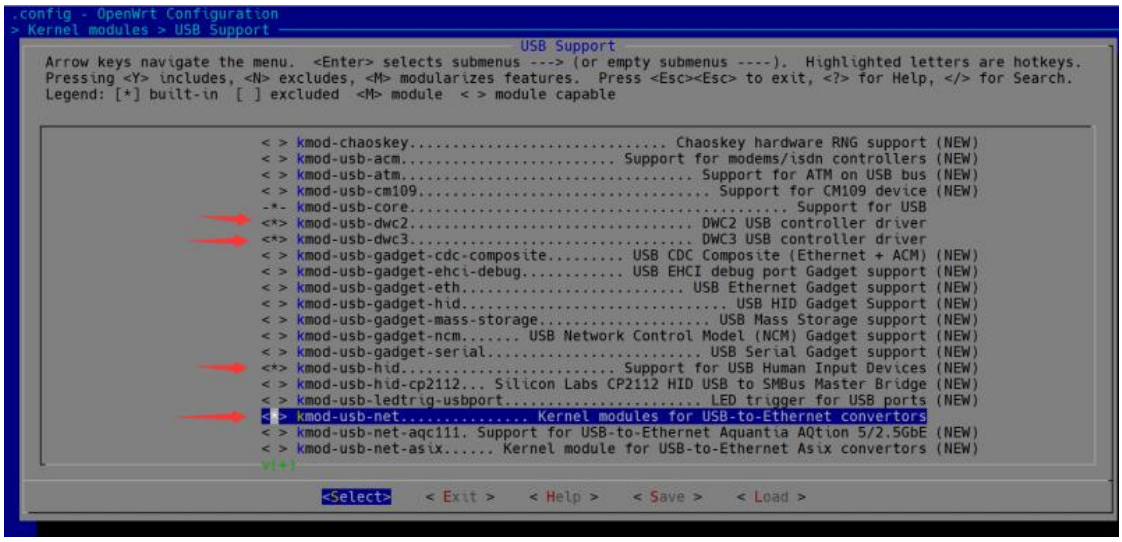
Navigate to `kernel modules` and select `kmod-i2c-xxx` as following picutres:

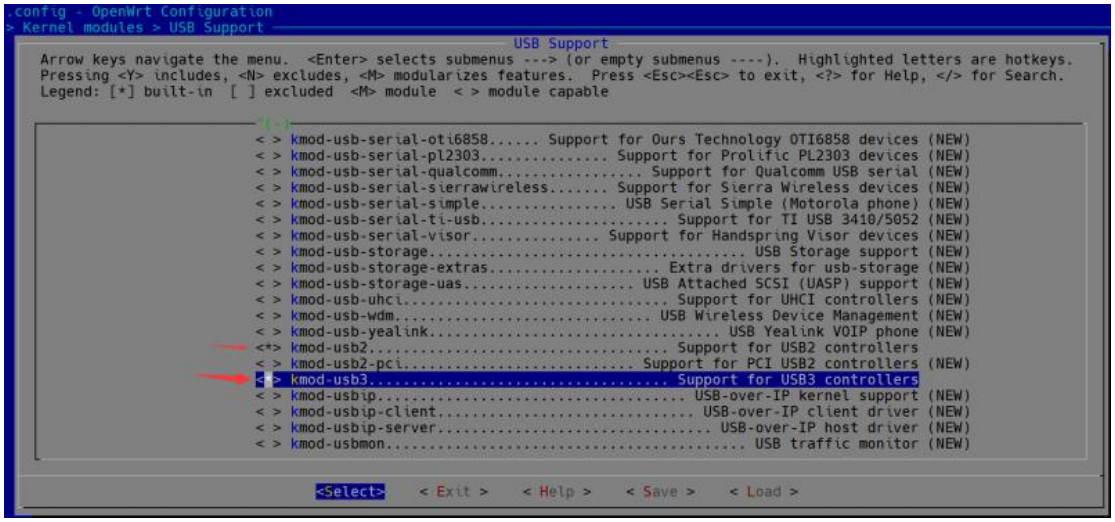




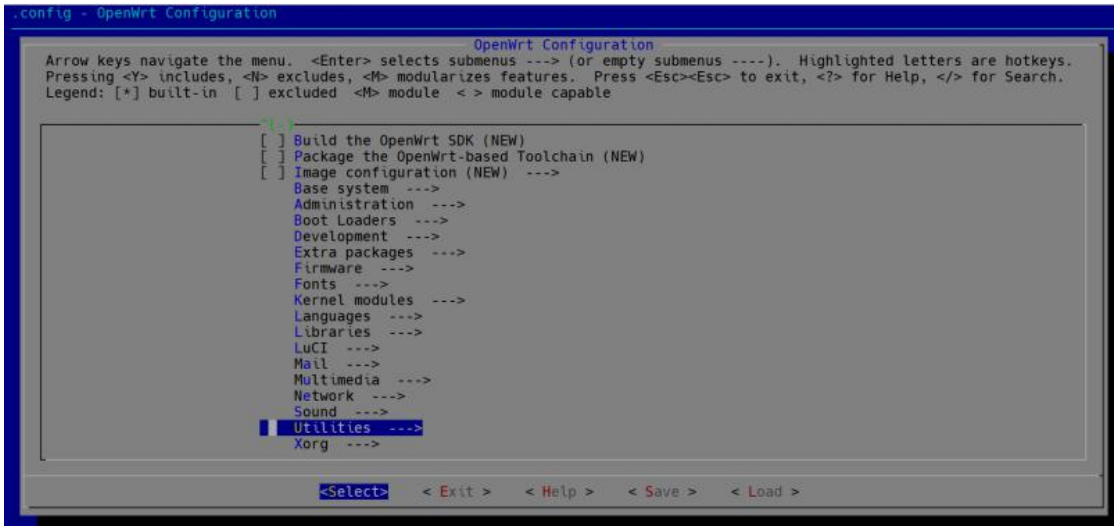


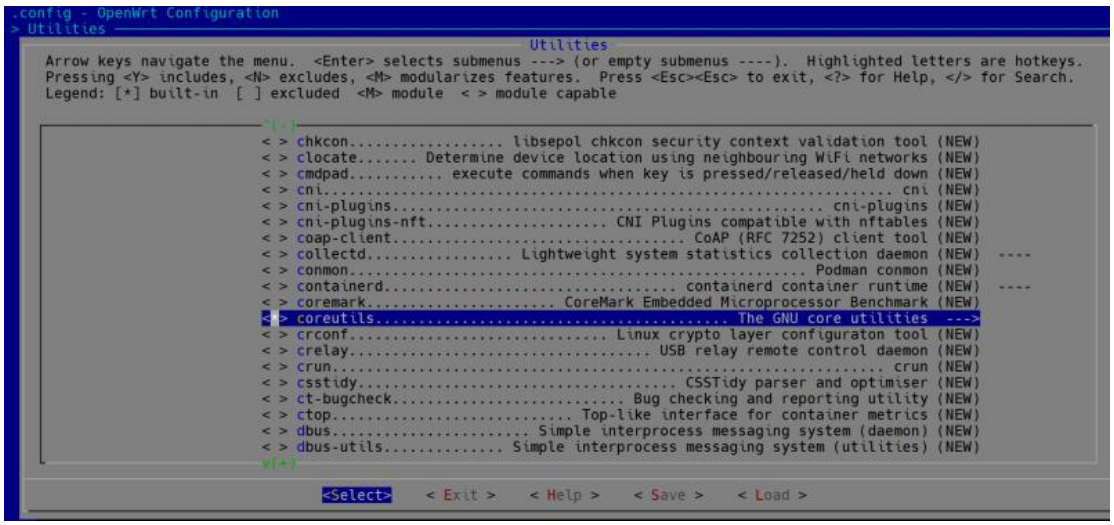
And then navigate to `USB Support` to add usb2 and usb3 support.



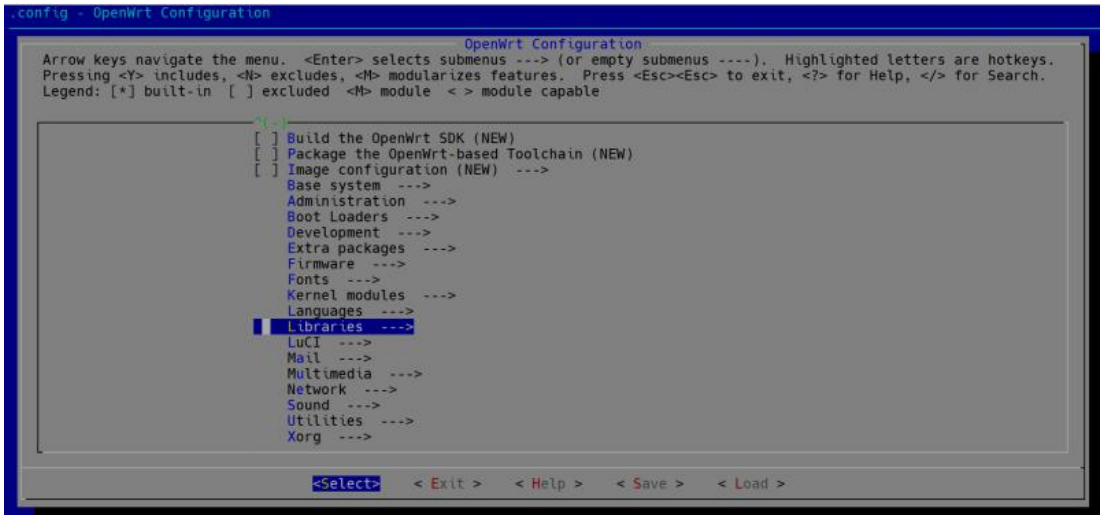


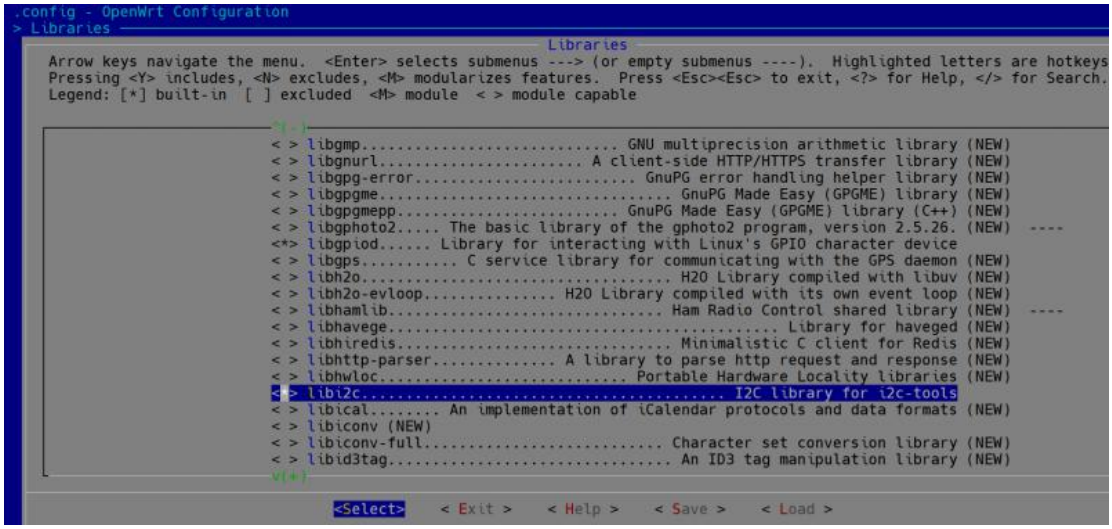
And then select `coreutils` in `Utilites` menu.



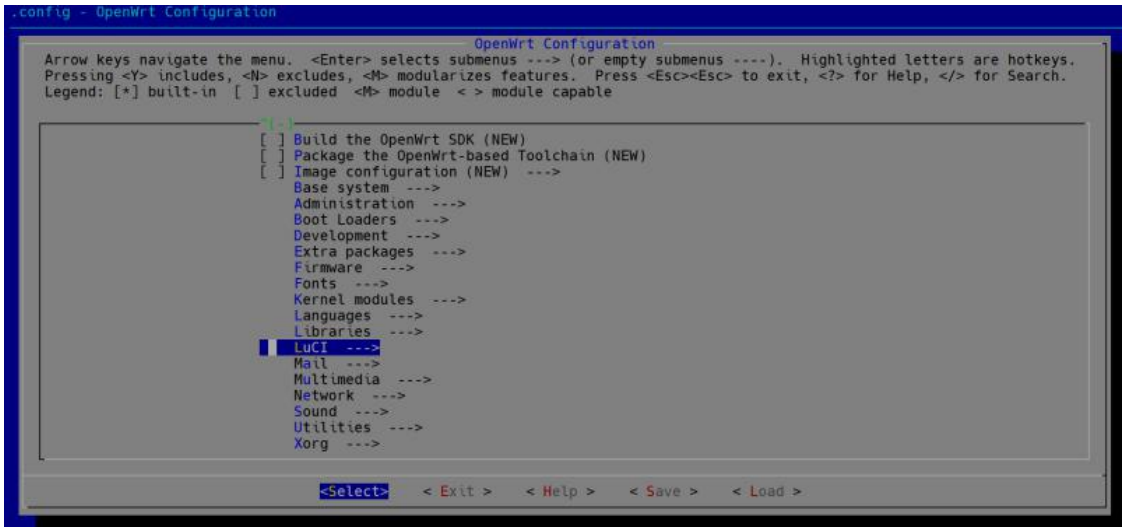


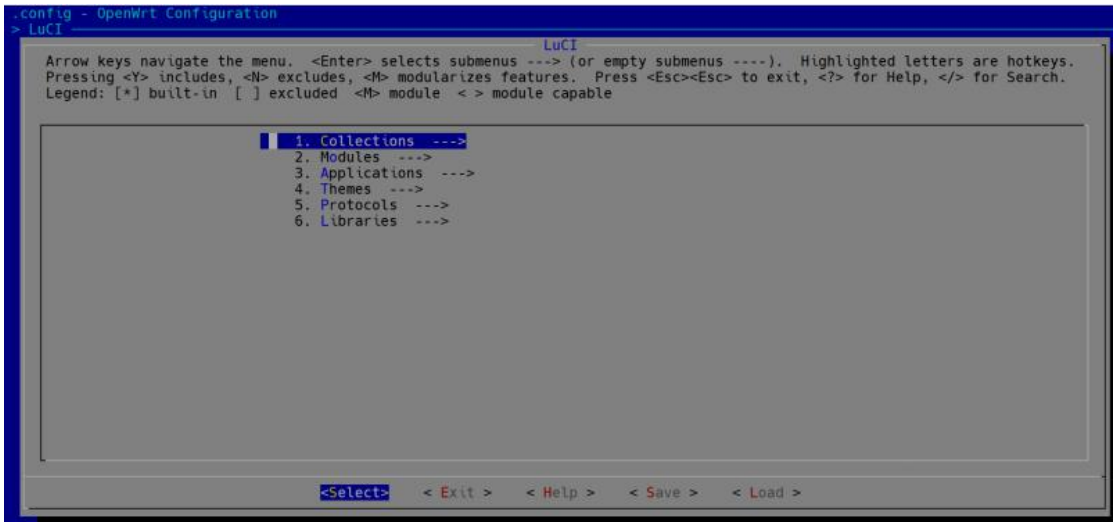
and enable `libi2c` in `libraries` menu.

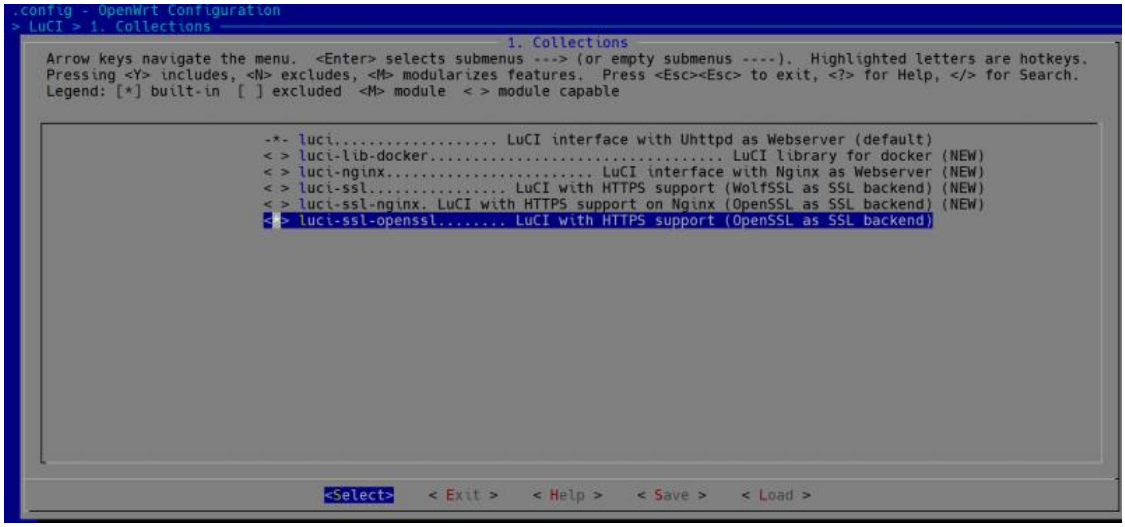




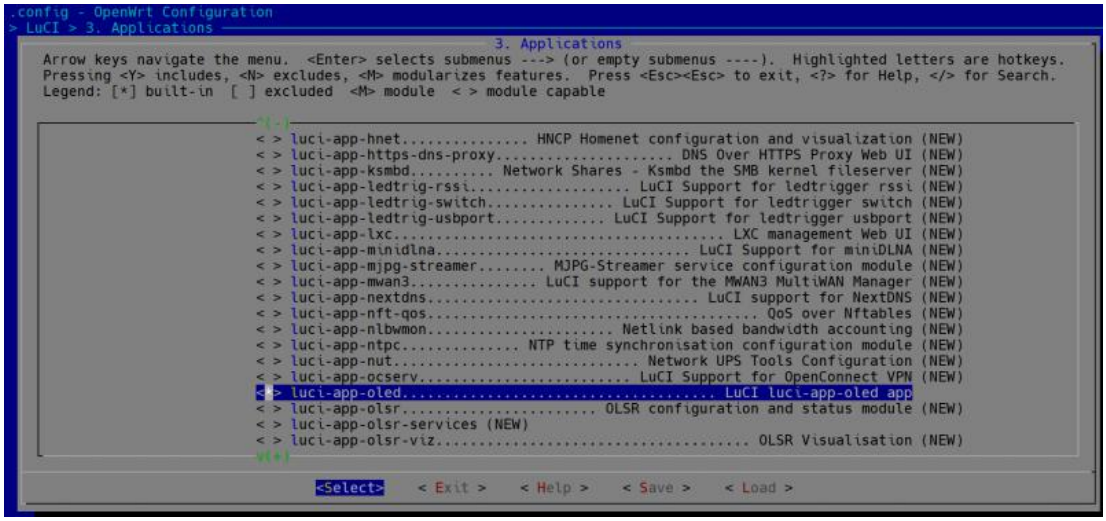
Next step is to enable LuCI `Collections` and `applications`.



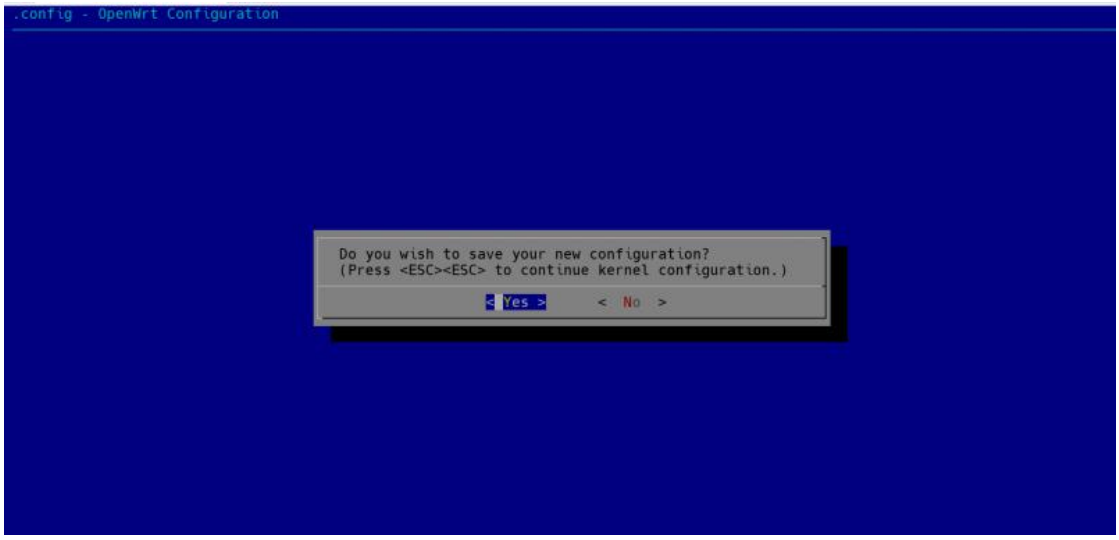




Navigate to `Applications` -> `luci-app-oled` and check it:



Save the configuration to `.config` file



- Compile it with following command:

```
make V=s -j1
```

It may take a while, grap a cup of coffee.

- Firmware will be generated on location:

```
~/openwrt/openwrt/bin/targets/bcm27xx/
```

- Factory image file: openwrt-bcm27xx-bcm2711-rpi-4-ext4-factory.img.gz or openwrt-bcm27xx-bcm2711-rpi-4-squashfs-factory.img.gz

- Sysupgrade image file:
openwrt-bcm27xx-bcm2711-rpi-4-ext4-sysupgrade.img.gz or
openwrt-bcm27xx-bcm2711-rpi-4-squashfs-sysupgrade.img.gz
- Flash the facotory image file to TF card via using `etcher` tool and insert the TF card to CM4_router_board, connect the 5V power supply.
- After booting, please connect your PC or just using Raspberry Pi to the ethernet cable on CM4 Router Board in `port0` or `port1`, and then open a browser, and typing administration address:

```
192.168.1.1
```

- Account: root
- Password is not set. please change the password once you login.

Enable I2C device in Customized OpenWRT

- Modify `/boot/config.txt` file and add this line:

```
dtoverlay=i2c-gpio,i2c_gpio_sda=2,i2c_gpio_scl=3,i2c_gpio_delay_us=2,bus=1
```

Save it and reboot Raspberry Pi CM4 Router Board.

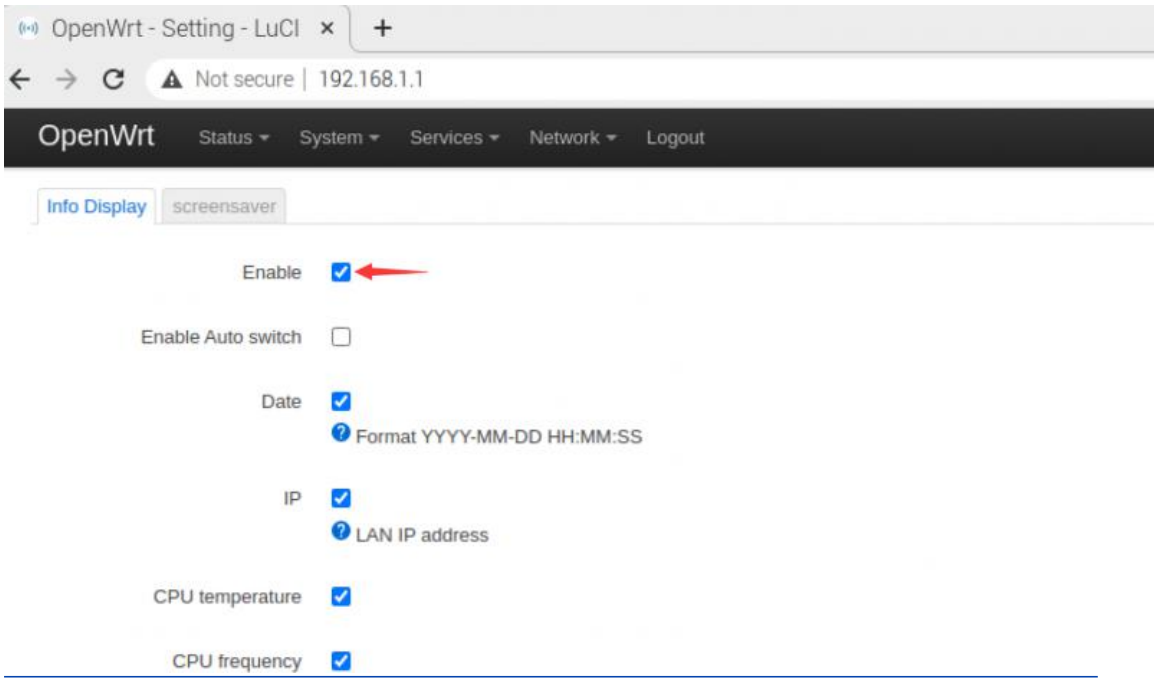
- Change the Permission of `/etc/init.d/oled` file:

```
chmod 755 /etc/init.d/oled
/etc/init.d/oled restart
reboot
```

- After reboot, try to test if it can detect the oled's address `0x3C`

```
root@OpenWrt:~# i2cdetect -y 1
     0  1  2  3  4  5  6  7  8  9  a  b  c  d  e  f
00:                         -- -- -- -- -- -- -- --
10: -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
20: -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
30: -- -- -- -- -- -- -- -- -- -- -- -- 3c -- -- --
40: -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
50: -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
60: -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
70: -- -- -- -- -- -- -- --
root@OpenWrt:~#
```

- Login to LuCI interface via browser and enable it, and then you can find the OLED in `service` tab, you can configure it as the notifications.



- Check the checkbox on `enable` and click `save it and apply`.